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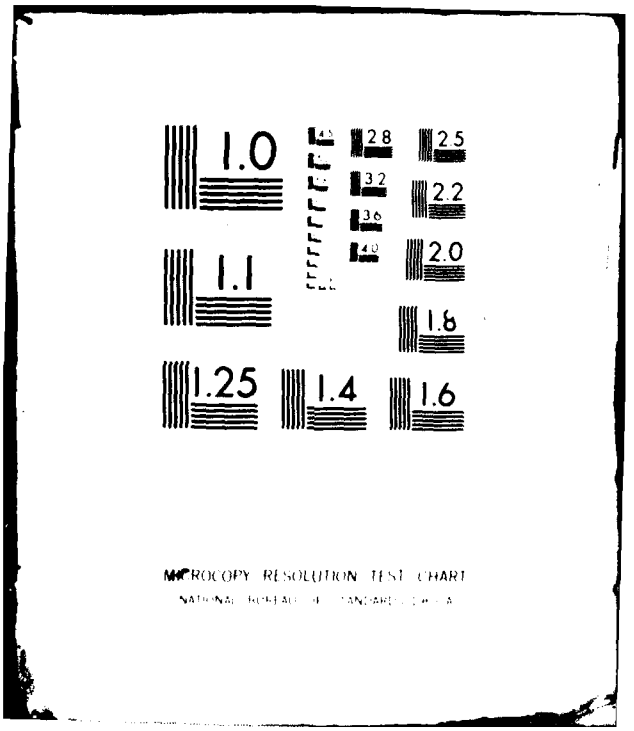
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DEVELOPMENT OF A PHYSICAL SECURITY DATA MANAGEMENT SYSTEM
VOLUME I – MANUAL INFORMATION STORAGE AND RETRIEVAL SYSTEM

by

J. Caldwell
P. Benner
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April 1980

Prepared for

CIVIL ENGINEERING LABORATORY
Naval Construction Battalion Center
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TECHNICAL REPORT ON MANUAL INFORMATION STORAGE AND RETRIEVAL SYSTEMS

The Civil Engineering Laboratory (CEL) of the Naval Construction Battalion Center, Port Hueneme, California, has identified the need for a data management system capable of enhancing CEL Research, Development, Test and Evaluation (RDT&E) activities in physical security. Previous work in this field undertaken for CEL* was directed toward a preliminary definition of an information storage and retrieval system, as well as the preparation of an indexing thesaurus for implementation of the selected system. Work completed included a review of candidate manual information storage and retrieval systems and the identification of a manual system to suit the needs of CEL and its user community. As part of its work for CEL, Mission Research Corporation (MRC) has reviewed this work and further examined manual information storage and retrieval systems. Three manual systems were identified and examined to determine their compatibility with the current CEL needs. Accordingly, this report is divided into the following areas: a brief discussion on indexing; details on how the candidate systems work, including their capabilities and limitations; and recommendations on the selection and implementation of a manual system.

*Information Storage & Retrieval System for Physical Security RDT&E Program, N62583/75 M X162, Dataflow Systems, Inc., January 6, 1975.

Indexing Thesaurus, Dataflow Systems, Inc., June 13, 1975.

BACKGROUND INFORMATION

Terminology

The design and activation of an information storage and retrieval system necessitates that documents be indexed by subject under index terms or descriptors. A complete set of index terms make up the index language. The CEL Indexing Thesaurus uses each entry as an index term; the thesaurus itself constitutes the index language. Heirarchy Terms (HT) are used to organize the index terms into subgroups.

Once the index language has been determined, documents must be read and assigned index terms. The number of index terms assigned to each document is determined according to the needs of the user. To ensure consistency among indexers, however, it is important that the index terms are decided upon before the indexing procedure begins. This controlled list of index terms is generally referred to as controlled vocabulary or authority list.

Pre- and Post-Coordination

The index language of any given subject should include the capability to express the subject matter of documents in varying degrees of complexity. Generally, manual systems can use two different approaches to develop a system vocabulary for indexing and retrieving documents. They are referred to as pre- and post-coordination.

For CEL purposes, use of a pre-coordinated system is questionable. This system creates index terms which uniquely identify very specific topics. It includes labels identifying specific classes or categories that are the logical product of more than one class. This is done by assembling all the

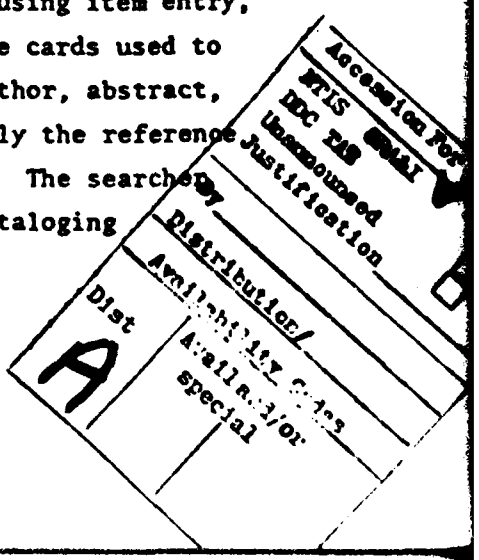
components, or as many as possible, under one subject heading before indexing. A typical example of this system is a library card catalog. Documents are listed according to their subject matter, and described in the greatest detail possible.

An example of an index term formed through pre-coordination is "audible door alarms." Using this as an index term, one uniquely identifies the product of three separate classes; doors, alarms and audible. Pre-coordination attempts to render each heading as specific as possible, although this is not always achieved. One may lose valuable information by not knowning exactly what subject heading to use for a search.

The post-coordinated approach defines only relatively basic classes when developing index terms. The best way to make the distinction between the two systems is that post-coordination uses one index term for each concept, whereas pre-coordination uses one or more concepts in each subject heading. In other words, to use pre-coordinated index terms to search for a document dealing with audible door alarms, one would cross-index the descriptors "doors," "alarms," and "audible." When searching, one can use some or all of the descriptors (index terms). Post-coordination, therefore, allows for greater flexibility since search terminology is developed to suit the specific needs of the searcher.

Item and Term Entry

Using post-coordinated index terms, search cards can be organized in two ways. They are item entry and term entry. When using item entry, basic information about each document is contained on the cards used to search with. Document information can include title, author, abstract, etc. Term entry refers to searching procedures where only the reference number (accession number) of the document is identified. The searcher must then go to the document itself or some secondary cataloging



system to find document information. These concepts, and others, are further explained in the following discussion of the three candidate manual storage and retrieval systems.

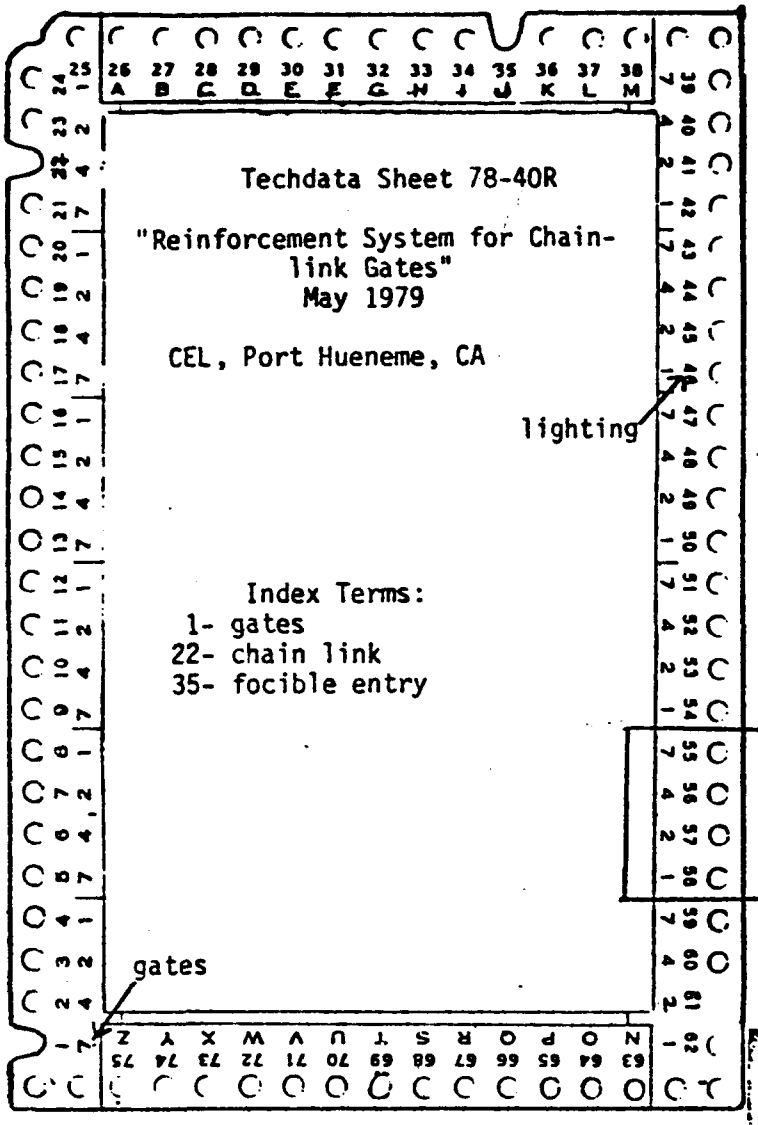
MANUAL STORAGE AND RETRIEVAL SYSTEMS USING POST-COORDINATION

As previously mentioned, a truely post-coordinated indexing system utilizes one concept per term. To search for information on a specific topic, the component terms can be searched for separately, or some or all of them can be used. Once again, it is important to emphasize that the index term "audible door alarms" would never appear in a system using post-coordinate index terms. One would have to cross index using the component terms in order to identify documents dealing with all three.

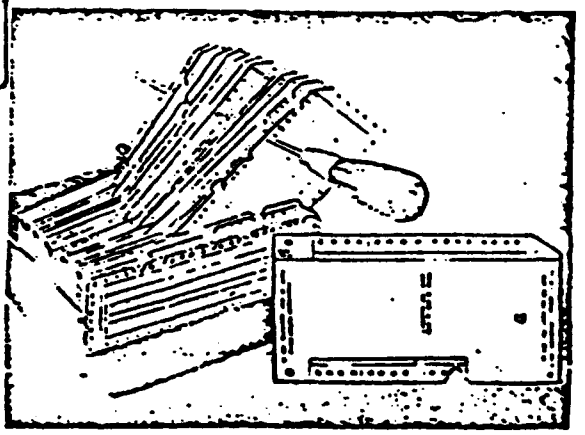
Three types of manual card systems employ post-coordination, each requiring a card for storage and retrieval. The three card systems- edge-notched cards (item entry), scan match cards (term entry), and peek-a-boo cards (term entry)- are each known by a variety of names. While all of the names will be identified, those shown above will be used throughout the remainder of this report. The following discussion describes how these card systems are organized and how they work.

Edge-Notched Cards

Edge-notched cards are an item entry system since document information is contained on the card itself. Figure 1 shows a card with document information for a Techdata Sheet on "Reinforcement System for Chain-link Gates." When using this card method for storing and retrieving documents, title, author, publisher, date abstract, and so on are recorded directly on the card.



SAMPLE CARD



EDGE-NOTCHED CARDS

Figure 1. Edge-Notched Card System

All index terms (descriptors) which relate to the item on the card are directly coded into the outer holes. (A typical edge-notched card contains 100 holes.) When using this direct coding method, only as many terms may be used as there are holes on the card. Each index term is then assigned a number corresponding to one of the numbered holes on the card, making each hole represent one term. Holes that relate to the item on the card are then broken, or notched, so that the hole is no longer closed. For example, if gates are discussed in the document, and gates has been assigned descriptor hole #1, the hole is notched. Hole #46, which is assigned to the term lighting, is not punched since lighting is not discussed in the document.

Once the card has been properly notched, one can begin to retrieve items. Using the same example, if the goal is to isolate types of gates, a rod is inserted through the hole assigned to gates. All documents dealing with gates will fall off the needle since their "gate" descriptor hole has been broken. To get more specific and find a document that deals with gates that are resistant to forcible entry, one simply uses the fallen pile of gate documents and inserts the rod through the forcible entry hole. Once again, all the items that use the index term searched for will fall out of the card pack.

It is important to note (see Figure 1) that although most edge-notched cards contain less than 200 holes, one can increase the amount of terms by using the second row of numbers (7,4,2,1) in combination as listed below:

0	No punch	5	4 and 1
1	1	6	4 and 2
2	2	7	7
3	2 and 1	8	7 and 1
4	4	9	7 and 2

A unique identity must be established for each grouping. Nine descriptors can be then utilized for every four holes on the card. The numbers 1, 2, 4, and 7 require one pass of the needle since only one hole is notched to represent the number. However, the numbers 3, 5, 6, 8 and 9 require two passes of the rod since each number is represented by using different combinations of two holes. This coding system significantly increases the amount of descriptors that can be used on a card. On an 8" x 10½" card containing 174 holes, the maximum number of descriptors that can be used is increased to 360.

A guiding rule is to choose a coding scheme that will minimize the number of "false drops." A false drop is defined as a document produced by a search that does not use the index term being sought. Unfortunately, the 7-4-2-1 systems carries with it a high probability of producing false drops. For example, five is represented by notching four and one, and nine is represented by notching seven and two. When both five and nine are used in the same grouping on a card, all four holes will be notched. Any time any number in the grouping is searched for, the card will drop. The 7-4-2-1 system is best used when each document will have only one descriptor notched in each four hole grouping.

The number of descriptors can also be increased by use of an indirect coding scheme. Unlike direct coding, which uses one hole per term, indirect coding uses two holes per term. Two number are assigned at random to each term, (for example, the index term "exits" might be assigned holes 11 and 12, or 11-12). A card containing 100 holes would have 00-00 to 99-99 codes—or 10,000 in all. However, 11-12 is the same as 12-11 since the same two holes are notched. Therefore, the total number of combinations is by definition reduced by half. In addition, all combinations using the same two numbers must also be excluded. Below is the equation for computating the total number of operational holes for a card with N holes.

$$N_u = \frac{(N \times N) - N}{2} = \frac{N(N - 1)}{2}$$

N = total number of holes

N_u = number of unique combinations

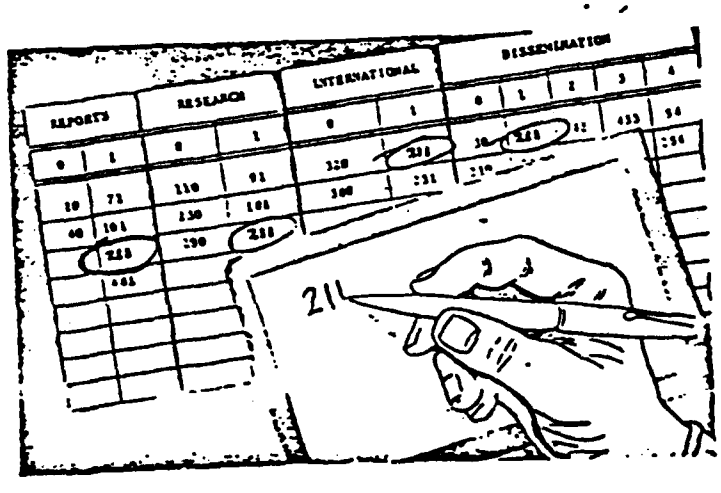
Again, consideration must be made as to the probability of false drops should the decision to use indirect coding be made. This probability could be greatly reduced by using a computer developed random numbers list that automatically excluded all duplications (i.e., 11-12 and 12-11) and all diagonals (i.e., 11-11). The list also aids in scattering the numbers used rather than numbering them sequentially.

Scan Match Cards (Also known as Scan Column Cards and Uniterm Cards)

The Scan Match Card System is a term entry system since cards identify only the accession numbers of documents relating to the index term on the top of the card. In Figure 2, all the document numbers listed relate to computers. In the case of a descriptor requiring further clarification, an operational definition is included on the card. This is done to define the index term, rather than narrow the subject heading as is done in pre-coordination.

The card is divided into 10 columns. Document accession numbers are placed in the numbered columns according to their last number. This is done to allow the card to fill up evenly, as well as to make scanning easier. While the card catalog requires one card for every document using the same subject heading, the scan match card uses one card for each index term. Each card records as many document accession numbers as the card will hold. It should be noted, however, that the search yields only a document accession number. One must locate the document or refer to some secondary cataloging system for all other document information.

Meaning is Identical to!									
COMPUTERS 2	"Electronic Digital Computers"								
0	1	2	3	4	5	6	7	8	9
20	1	192	63	14	65	76	7	148	9
160	191	232	123	64	415	16	197	128	79
200	221	32	133	124	915	36	27	138	189
120	131	122	363	134	875	126	147	398	219
390	781	192	913	394		396	397	798	129
410	761	142		374		906	407	908	139
710		772		404			707	878	399
730				714			907		409
				804			877		699
									909



Scan-Match Cards

Figure 2. Scan Match Cards

When the index term itself is not specific enough to suit the searchers needs, this card method allows the searcher to choose a second index term to find documents using both. One simply "scans" the two cards and "matches" accession numbers appearing on both. More descriptors can be added depending on the needs of the searcher, and the time allotted the searcher to cross match.

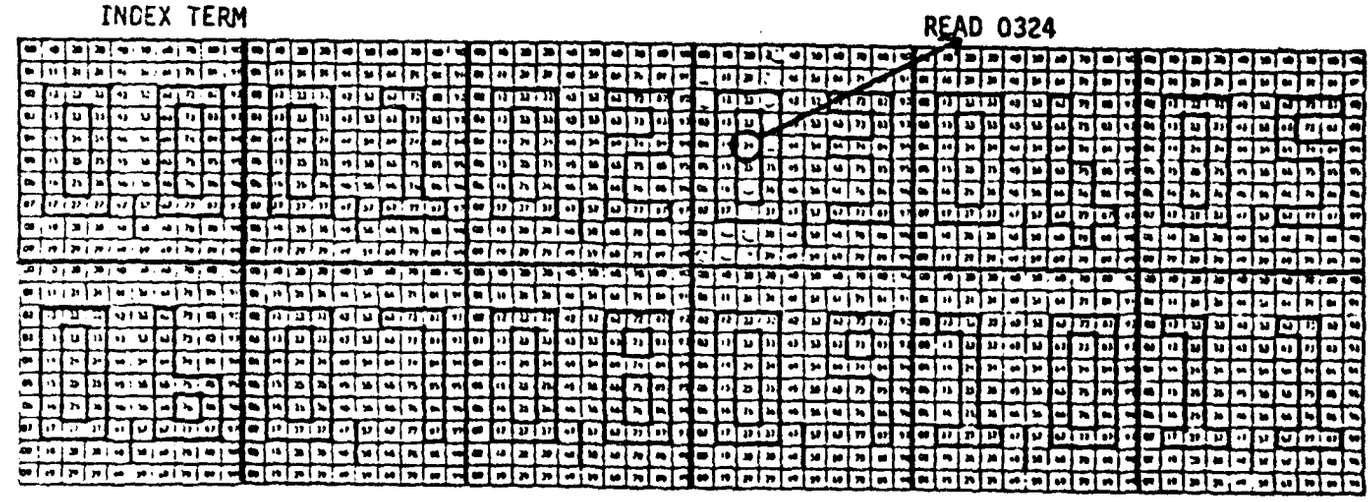
Peek-A-Boo Cards (Also known as Optical Coincidence Cards)

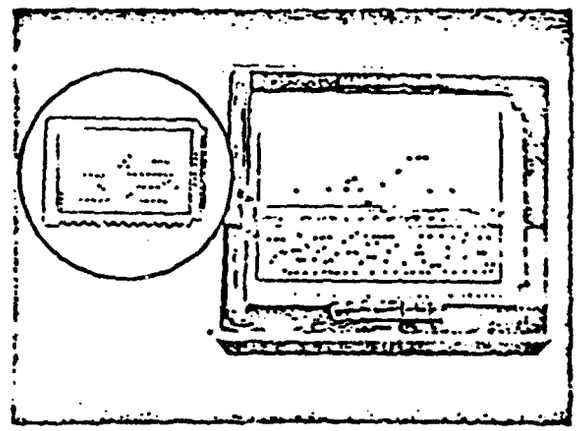
As in the case of scan match cards, the peek-a-boo system utilizes a term entry card format. The only information available to the searcher is the document accession numbers which fall under the term. The searcher must use the accession number to locate the document to determine all additional information. The peek-a-boo system does lend itself, however, to cross-indexing far more readily than the scan match method.

The layout of a peek-a-boo card is illustrated in Figure 3. It should be noted that while most peek-a-boo cards are on 10" x 12" sheets, they are set-up identically to the card appearing in the example. The only difference is a greater number of boxes which can accomodate up to 10,000 accession numbers. Card size is usually adjusted according to the number of documents to be stored.

Each document is assigned a four digit number which corresponds to a position on the card. The number is read by using the large numbers as the first two digits of the accession number. The small numbered boxes within the large box contain the last two digits (see Figure 3).

Index terms and any required definitions appear on the top of the card. The accession numbers of the documents that relate to the index term are then punched out leaving a hole. To determine which documents fall under a given subject, the card is simply held to the light and the





Optical Coincidence (Peek-A-Boo)

Figure 3. Peek-A-Boo Card

numbers of all boxes punched are recorded. Cross indexing is simply a matter of placing two or more cards together and holding them over a light box. (A light box consists of a frame with a sheet of translucent material on the top and a light source mounted inside. The light box is not a necessity, but it does make identification of common holes much easier when more than one descriptor is used.)

ADVANTAGES AND DISADVANTAGES

Many specific questions must be answered before a decision can be made with respect to which of the three manual information storage and retrieval systems will best suit the needs of CEL. At this point, a critique of the alternatives, examining their strengths and weaknesses is required. The paragraphs below discuss the respective advantages and disadvantages of each of the three systems described above.

Edged-Notched Card Method

Advantages. The edge-notched card method offers storage for an unlimited number of documents. If a system begins to have an unmanageable amount of cards, they can easily be arranged according to a hierarchy of terms. Another advantage is that each card in the file contains all document information. In addition, very little equipment is required for card preparation and searching. Finally, cards do not need to be kept in any order unless, as already mentioned, they are separated by overall subject heading. It should also be noted that the materials for this system are inexpensive.

Disadvantages. The most obvious disadvantage of the edge-notched method is that it limits the number of descriptors, or index terms, that can be used. There are ways to increase the number, however, which if used properly do not alter the simplicity of the system. Another

consideration is that a careful coding process and a flawless thesaurus are essential. The thesaurus, or some form of indexing manual, is required to indicate codes assigned to descriptors. Finally, searching a large file presents another drawback in that it can be tedious unless the searcher knows what he needs and is familiar with the index terms.

Scan Match Card Method

Advantages. The scan match method offers the capability of storing unlimited amounts of documents and descriptors. The system is also quite inexpensive. In fact, many organizations design and print their own cards. An additional advantage is that although the system is quite old (late 1940's) step-by-step discussions on how to choose index terms for scan match systems are available.

Disadvantages. The most obvious disadvantage of scan match is that the result of a search is only an accession number. The searcher has no knowledge of the search product until the document, or some secondary catalog, is consulted. The searcher becomes caught in somewhat of a "Catch-22" situation. If only two descriptors are used, the search result is usually large numbers of documents. Considerable time is then spent in locating, reviewing and screening documents. However, when he chooses to cross four, five or more descriptors, he is presented with the tedious job of comparing a large volume of accession numbers. Although this system is quite inexpensive and can be implemented easily, it is far the most difficult system for daily use.

Peek-A-Boo Card Method

Advantages. The peek-a-boo card method has enjoyed popularity in recent years. Depending upon the size of the card, up to 10,000 documents can be stored. Cards do, however, come in various sizes corresponding

to the number of documents in the file. A forecast to determine the projected amount of documents is required. The system also allows the use of as many index terms as are needed and manageable. In addition, indexing of new documents is simply a process of punching the accession number holes of the cards with the desired descriptor. Finally, the searching procedure itself is straight-forward regardless of file size.

Disadvantages. Like scan match, separate accession files must be maintained since searches result in accession numbers only. Although there is a limit to the amount of document accession numbers that can be stored on each card, it is unlikely that CEL's records will reach 10,000 before they become automated. Accurate punching is obviously required, although even a slightly uncentered punch will still allow enough light through the card stack for search purposes. Finally, in comparison with the manual systems already discussed, the peek-a-boo system is more expensive. The cost of commercial peek-a-boo cards exceeds that of cards used in other manual systems. A commercial punch, which can penetrate a small thickness of cards, costs about $80. A simple hand punch or leather punch, however, has been found to be effective. A light box is probably the most expensive of all the equipment to be purchased (approximately $150).

Table 1 summarizes the differences among the three manual systems by describing them in terms of system constraints, operational characteristics and automation considerations.

The number of documents and descriptors that the manual systems can employ (see Table 1) are described in terms of "absolute" and "practical." This distinction has been made to differentiate between the saturation point of a system and its realistic working limitations. Eventually, rapidly growing information systems may operate more efficiently by using automation technology. Manual systems are practical, however, as long as one is aware of where system inefficiency occurs in terms of maximum number of

Table 1. Manual Information storage and retrieval systems matrix.

	EDGE NOTCH		SCAN MATCH	PEEK-A-BOO
	DIRECT CODING	INDIRECT CODING		
SYSTEM CONSTRAINTS				
NUMBER OF DOCUMENTS (ABSOLUTE)	UNLIMITED	UNLIMITED	AS MANY AS FIT IN THE 10 COLUMNS ON THE CARD	4,900
NUMBER OF DOCUMENTS (PRACTICAL)	1,500/FILE*	1,500/FILE*	NO MORE THAN 150 ACCESSION NUMBERS/CARD	4,900
NUMBER OF DESCRIPTORS (ABSOLUTE)	174	4,900	UNLIMITED	UNLIMITED
NUMBER OF DESCRIPTORS (PRACTICAL)	174	1,200*	5,000*	10,000*
EQUIPMENT COST (APPROXIMATE)	$125.00/500 CARDS $6.00/NEEDLE $15.00/PUNCH	FILING CABINET COLORED CARDS SORTING BOX	DESIGN AND PRINT OWN CARDS	$75.00/PUNCH $150.00/LIGHT BOX $100.00/150 CARDS
MAINTENANCE REQUIREMENTS	CARDS MUST BE SORTED BY HIERARCHY TERMS—NO OTHER FILING SYSTEM REQUIRED		MAINTAIN CARDS IN ALPHABETICAL ORDER	MAINTAIN CARDS IN ALPHABETICAL ORDER
OPERATIONAL CHARACTERISTICS				
DESCRIPTION OF CARD	ITEM ENTRY	ITEM ENTRY	TERM ENTRY	TERM ENTRY
SEARCH OUTPUT	ALL DOCUMENT INFORMATION (TITLE, AUTHOR, ACCESSION NUMBER, ABSTRACT, ETC.)		ACCESSION NUMBER ONLY	ACCESSION NUMBER ONLY
SEARCH PROCEDURE	ONE PASS OF THE ROD PER TERM 100 CARDS AT A TIME*	TWO PASSES OF THE ROD PER TERM 100 CARDS AT A TIME*	COMPARE CARDS AND IDENTIFY NUMBERS APPEARING ON BOTH SEARCHES ARE TIME CONSUMING	HOLD CARDS OVER LIGHT BOX AND IDENTIFY HOLES SEARCHES ARE FAST
IMPLEMENTATION	SEPARATE FILES FOR EACH HIERARCHY TERM		ONE FILE FOR ENTIRE THESAURUS	ONE FILE FOR ENTIRE THESARUS
CROSS INDEXING (2+ TERMS) LEVEL OF DIFFICULTY	VERY LOW	LOW	HIGH	MEDIUM
AUTOMATION CONSIDERATIONS				
DATA INPUT DIRECT FROM CARDS	ALL DOCUMENT INFORMATION		ACCESSION NUMBER	ACCESSION NUMBER
SUSCEPTIBILITY TO AUTOMATION	MEDIUM TO HIGH		LOW	LOW

*Values marked with an asterisk are estimates.

descriptors and documents. Manual systems that suit the needs of a newly developed library may require replacement as files become larger and more complex. Therefore, when selecting a manual system it is important to recognize its strengths and weaknesses, in addition to file characteristics and future growth potential.

ANALYSIS OF MANUAL SYSTEMS

In determining which of the three systems discussed would best suit CEL's need for an information storage and retrieval system, three criteria were given close examination. Search procedure, search output and compatability with automated systems were found to be the most important aspects in choosing a system. After identifying and examining these criteria, the edge notched card system has been determined to be the most suitable manual information storage and retrieval system for use by CEL.

The scan match card system is extremely tedious and time consuming system when searching on a daily basis. The product of a scan match search is only an accession number. In order to obtain specific information, the document, or a secondary cataloging system, must be consulted. The scan match system also limits the ease of conversion from manual to automated systems. Document information cannot be entered directly from the search card without consulting a secondary source. Mission Research Corporation does not recommend using the scan match system for these reasons.

The peek-a-boo card system has essentially the same operational constraints as the scan match card system, however, the actual search procedure is straightforward. Like scan match, the product of a peek-a-boo search is an accession number. Again, one must go elsewhere to locate specific information concerning the documents identified in the search. The peek-a-boo system also limits the ease with which documents can be

entered into an automated system. Reading accession numbers off peek-a-boo cards during the transition from a manual to an automated system cannot be done efficiently or reliably by the user. Although automatic scanners that "read" the cards do exist, they are costly as well as unreliable. Due to these system limitations, the peek-a-boo card system is not recommended for use by CEL.

MRC feels the edge-notched card system is the most desirable manual system for CEL due to the simplicity of the search procedure, the extent of the search output, and its compatibility with automated systems. Coding schemes are available that sufficiently increase the number of descriptors that can be utilized withou losing the desired simplicity of the search procedure. Furthermore, since edge-notched cards employ an item entry format, all document information is produced directly from the search itself without consulting secondary catalogs. Edge-notched cards also allow efficient transition from a manual system to an automated one since each card contains document information in a manner that is compatible with computer format. Although edge-notched cards have been found to be the superior manual system, it should be noted that a concurrent analysis of computerized information systems is being done to determine if an automated system will better suit the needs of CEL.

IMPLEMENTATION OF EDGE-NOTCHED CARD SYSTEM

The thesaurus provided by CEL has been reviewed by the MRC project team and found to be compatible with CEL requirements. Should a manual system be desired, MRC has detailed an implementation plan for edge-notched cards using the indexing structure identified in the thesaurus.

The indexing thesaurus divides search terminology into eight general catagories, referred to as Hierarchy Terms (HT). These terms are:

Alarm Technology (AT)
Lock Technology (LT)
Control (CON)
Methods of Entry (MOE)
Types of Entry (TYE)
Builders Hardware (BH)
Security Administration and Management (SAM)
Facilities, Locations (FAC)

Each HT is then divided into major subject headings. Subject headings are further divided into their component parts which constitute the third level of indexing terminology. Table 2 illustrates the total number of index terms for each HT found in the CEL Indexing Thesaurus. This table was developed to determine the feasibility of an edge-notched card system in light of the number of index terms used in the thesaurus.

As previously stated, the number of index terms that can be used with an edge-notched card system depends upon the size of the card and how many holes it contains. This number can be increased by using various combinations of two holes, as done in indirect coding schemes. MRC feels that indirect coding is sufficiently manageable to be employed in the data management system outlined for use by CEL. Separate card files would, however, be established for each hierarchy term.

Commercial 8" x 10½" cards have 174 holes that can be coded directly for a maximum of 174 terms, that is, one hole per term. By using the same size card and employing indirect coding, only the first 100 holes are used to increase the total number to 4,950. To keep the system manageable and prevent false drops, however, the index terms used should be limited to a practical number. As shown in Table 2 the highest number of descriptors for any single Hierarchy Term (HT) is 329. By using direct coding for some hierarchy terms and indirect coding for others, edge-notched cards can be sucessfully used to contain the number and complexity of index terms identified in the CEL thesaurus.

HIERARCHY TERM	Subtotals			TOTAL
	2nd LEVEL TERMS	3rd LEVEL TERMS	4th LEVEL TERMS	
AT*	36	181	0	217
LT*	33	296	0	329
CON	14	57	31	102
MOE	13	76	26	115
TYE	18	0	0	18
BH*	51	98	14	163
SAM	6	21	2	29
FAC	23	8	0	31
TOTALS	194	737	73	1004

Note: Those hierarchy terms followed by an asterisk (*) represent the files that would require use of an indirect coding scheme due to the number of index terms. All others are small enough to use the direct coding method.

Table 2. Number of Descriptors Used for Each Hierarchy Term

Each hierarchy term, representing one unique set of cards (a file), uses a specific set of index terms. For those HTs compatible with the direct coding method, assigned hole sequence follows the alphabetical listing used in the thesaurus. That is, holes are assigned to terms by starting at a specified point on the card and continuing around it, following the order of the terms as they appear in the thesaurus. The hole location of each assigned term must be noted on the thesaurus.

For those HTs that necessitate the use of an indirect coding scheme, holes should be assigned randomly. Numbers are assigned randomly in order to reduce the possibility that a combination has not been used more than once. As previously stated, the coding choices exclude duplications and diagonals. The random list also aids in scattering those holes which are used throughout the entire card rather than concentrating them in one section of the card.

Once index term assignments are made and recorded, and documents are classified according to the terms identified in the thesaurus, document information is transcribed onto the edge notched card itself. Holes are punched according to the terms used to identify the document. Information about the document, such as title, author, accession number, abstract, and descriptor list, is placed on the body of the card according to the level of detail desired. A document abstract, if desired, can be placed on the reverse side of the card. It may be desirable to have three separate formats each representing a specific type of document: bibliographic/annotation form, vendor publication form, and CEL inhouse report form. Each format would include a form title and a corresponding colored line for easy visual identification.

CONCLUSION

MRC finds the edge notched card system to be the most suitable manual information storage and retrieval system for use by CEL. Document information is recorded and stored in a manner that is compatible with the way in which it will later be retrieved and used. Computerized information systems are being analyzed to determine if they can provide CEL with abilities that go beyond the scope of manual systems. Should a manual system be chosen, the edge notched card system is further recommended due to its operational characteristics and the ease with which it can later be automated.

DEVELOPMENT OF A PHYSICAL SECURITY DATA MANAGEMENT SYSTEM
VOLUME II – USER'S MANUAL

by

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April 1980

Prepared for

CIVIL ENGINEERING LABORATORY
Naval Construction Battalion Center
Port Hueneme,CA

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Santa Barbara, CA

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1 REPORT NUMBER	2. GOVT ACCESSION NO. AD A084 840	3. RECIPIENT'S CATALOG NUMBER
4 TITLE *(and Subtitle)* DEVELOPMENT OF A PHYSICAL SECURITY DATA MANAGEMENT SYSTEM; Volume II — User's Manual	5 TYPE OF REPORT & PERIOD COVERED Final Report for Period 1 Oct 78 — 31 Jan 80
	6 PERFORMING ORG. REPORT NUMBER MRC-R-531
7 AUTHOR(s) J. Caldwell, P. Benner, D. Solomonson	8 CONTRACT OR GRANT NUMBER(s) DNA 001-79-C-0182
9 PERFORMING ORGANIZATION NAME AND ADDRESS Mission Research Corporation, 735 State Street, P.O. Drawer 719, Santa Barbara, California 93102	10 PROGRAM ELEMENT PROJECT TASK AREA & WORK UNIT NUMBERS S&STNW&F 62713H Q42QAXR B203 01
11 CONTROLLING OFFICE NAME AND ADDRESS Civil Engineering Laboratory, Naval Construction Battalion Center, Code CEL L64, Port Hueneme, California 93043	12 REPORT DATE January 1980
	13 NUMBER OF PAGES 93
14 MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)*	15 SECURITY CLASS *(of this report)* UNCLASSIFIED
	15a DECLASSIFICATION DOWNGRADING SCHEDULE
16 DISTRIBUTION STATEMENT *(of this Report)*	
17 DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*	
18 SUPPLEMENTARY NOTES This work was sponsored at the Civil Engineering Laboratory by the Naval Facilities Engineering Command, and contracted for CEL by the Defense Nuclear Agency under RDT&E RMSS Code X3100 79469 Q42QAXRB 20301 H2590D.	
19 KEY WORDS *(Continue on reverse side if necessary and identify by block number)* Physical Security, Data Management, Information System, Computerized Information Storage & Retrieval, VOLUME II	
20 ABSTRACT *(Continue on reverse side if necessary and identify by block number)* ~~This report~~ is a user's manual describing the procedures for utilization of the Physical Security Data Management System developed for the U.S. Navy Civil Engineering Laboratory (CEL), Naval Construction Battalion Center, Port Hueneme, California. The Physical Security Data Management System is an information storage and retrieval system that was designed for in-house use by the CEL staff. CEL staff members every day need to access and use technical data from a wide variety of technical sources in performance of their physical Continued on 1473C	

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REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1 REPORT NUMBER	2 GOVT ACCESSION NO. 3 RECIPIENT'S CATALOG NUMBER
4 TITLE (and Subtitle) DEVELOPMENT OF A PHYSICAL SECURITY DATA MANAGEMENT SYSTEM; Volume II — User's Manual	5 TYPE OF REPORT & PERIOD COVERED Final Report for Period 1 Oct 78 — 31 Jan 80
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20. ABSTRACT (Continued)

security Research, Development, Test and Evaluation (RDT&E) functions. The Data Management System is a direct response to the CEL staff's in-house need for effective and efficient storage and retrieval of data and documentation to support RDT&E tasks and physical security problem-solving for the Naval Shore Establishment. The scope of CEL's current in-house RDT&E documentation relates to a broad range of physical security information domains including alarm technology, lock technology, control equipment, methods of entry, types of entry (threats), builders hardware, security administration and management, facilities (locations), barrier technology, attack resistant materials, and other specific RDT&E physical security categories in response to new forms of attacks against Naval Shore installations and facilities. The manual presents (1) an overview of the Data Management System's hardware and software capabilities including a description of the system configuration, (2) user instructions for completion of the Physical Security Data Management System Input Sheet, (3) user instructions for entry of data into the on-line Data Management System once an Input Sheet has been completed, (4) a description of batch outputs of the Data Management System including the Master List, Keyword Index and Keyword Count, and (5) user instructions for execution of data file searches in an interactive batch mode.

CONTENTS

SECTION 1
INTRODUCTION

1.1 BACKGROUND

The Civil Engineering Laboratory (CEL) of the Naval Construction Battalion Center, Port Hueneme, California, initiated a project during FY 1979 for the development of an in-house Physical Security Data Management System. This project is a direct response to the CEL staff's need for effective and efficient storage and retrieval of in-house data and documentation to support physical security problem-solving by CEL for the Naval Shore Establishment.

The scope of CEL's current in-house Research, Development, Test and Evaluation (RDT&E) data and documentation relate to a broad range of physical security information domains. These domains include Alarm Technology; Lock Technology; Control Equipment; Methods of Entry; Types of Entry, Threats; Builders Hardware; Security Administration and Management; Facilities, Locations; Law Enforcement Technology and Criminal Justice; Shore-Based Security Technology supporting shipboard security requirements (at shore-based facilities); Barrier Technology; Attack Resistant Materials; and a number of standardized categories relating to architecture and engineering such as those set forth in Sweet's Catalog File and the Uniform Construction Index.*

* Sweet's Catalog File is an annual publication designed for use by architectural engineers. The Guide contains manufacturers' product information which is organized according to 16 major subject headings (e.g., concrete, masonry, metals, woods and plastics, and doors and windows). The Uniform Construction Index (UCI) is a publication of the Construction Specifications Institute (CSI) that presents a coordinated system of formats for specifications, data filing, cost analysis and project filing. The UCI is based on the 16 divisions of Sweet's Guide.

Traditional systems for information storage and retrieval, ranging in sophistication from shoe boxes stuffed with filing cards to more elaborate manual systems with multi-tiered categorization schemes and indexing thesauri, only can meet information requirements up to a certain level of detail. In the case of the CEL staff's requirements, the research performed indicated that manual systems rapidly reach the limits of their capabilities when the usable output information that is required is very specific.*

Additional investigation revealed that the conversion of a manual system to an automated one can yield significantly better outputs for the user at a relatively low, or even negligible, additional cost. The trade-off analysis between the manual and automated systems under consideration turned on the issue of specificity of information. As the automation feasibility analysis noted, CEL staff members every day need to access and use technical data from a wide variety of technical sources in performance of their physical security RDT&E functions. The technical sources include DoD reports, government laboratory reports, commercial product catalogs, military specifications and standards, DoD directives and manuals, service regulations, research texts, contractor reports, in-house technical notes and data sheets, and reference texts. At present, there are an estimated 600 separate items in the CEL in-house physical security document collection and it is growing rapidly.

* Benner, P., Caldwell, J. and Solomonson, D., Development of a Physical Security Data Management System, Volume I. Manual Information Storage and Retrieval Systems, MRC/WDC-R-003, Mission Research Corporation, September 1979.

The results of this investigation will be documented in a separate technical report to be entitled, "Automation Feasibility Analysis."

CEL staff utilization of the above source materials is often very specific. For example, the need to quickly access relevant information about multiple-bolt door locking systems, which must meet a minimum delay timeline as set forth in a military specification, is one indication of the level of specificity required when information searches are undertaken. Another example is accession of the types of materials available for construction of a security guard shack which are resistant to .30 caliber automatic weapons fire. While these illustrations do not indicate the full range of queries to which the CEL staff responds every day, they indicate the level of technical detail which is often required. Most naval users want explicit answers to explicit questions, and they generally want detailed and reliable information in a hurry, sometimes to solve an immediate operational problem.

1.2 SYSTEM PURPOSE AND REPORT ORGANIZATION

This Users' Manual describes the CEL Physical Security Data Management System from the point of view of in-house CEL staff members who will use the system. Section 2 is an overview of the system's hardware and software capabilities and includes a description of the system configuration. Section 3 presents user instructions for completion of the Physical Security Data Management System Input Sheet (hereinafter Data Input Sheet) that has been designed and tested for preparation of records to be entered into the on-line system. Section 4 presents user instructions for entry of data into the on-line Data Management System once a Data Input Sheet has been completed. Section 5 describes the batch outputs of the Data Management System including the Master List, Keyword Index and Keyword Count. Section 6 outlines the scope of prospective user instructions for execution of data searches from a remote terminal in an interactive batch mode.

SECTION 2
OVERVIEW OF DATA MANAGEMENT SYSTEM

2.1 GENERAL DESCRIPTION

The Physical Security Data Management System is an information storage and retrieval system specifically designed for the CEL Physical Security Laboratory research staff. Four user criteria were applied to the development effort. First, the system has been developed to support the CEL staff as in-house users. Second, it has been designed to provide outputs at a level of detail that is specific to user needs. Third, it has been designed for simplicity of user operation. Fourth, it has been designed for economy of operation.

The current capabilities of the Physical Security Data Management System are based on a software package, known as FAMULUS, which is operating on an Itel Advanced System 6 (AS/6) at the Computer Center of the University of California, Santa Barbara. FAMULUS is an integrated set of FORTRAN IV programs for information storage and retrieval. It consists of 11 programs that enable the user to create, correct, update, sort and merge, index, search and print large files of bibliographical information. The programs are simple to use and the costs are moderate on the UCSB hardware. A more detailed exposition of FAMULUS is set forth in the FAMULUS Users' Manual in the Appendix.

In summary, the selection was based on five straightforward considerations. First, it is a fully debugged system which is "up and running."

Second, there is no software purchase cost. FAMULUS is free to any user. Third, it is operating at the UCSB Computer Center where CEL, as a government laboratory, is a welcome user.* Fourth, FAMULUS is operating within a user community that uses the software continuously. The support services for FAMULUS, including enhancements, are excellent at the UCSB Computer Center. Fifth, there is persuasive evidence that the FAMULUS programs are easily transferable from one IBM mainframe to another or to an IBM plug-compatible mainframe.† In short, the Itel AS/6-FAMULUS arrangement is cost-effective.

2.2 SYSTEM CONFIGURATION

Figure 1 is a flow chart showing the principal procedures that have been built into the Physical Security Data Management System. The system consists of a series of execute files which facilitate the entry of bibliographical records into an on-line file, and a series of FAMULUS programs which generate printed output reports and which permit on-line entry of instructions for file searches.

* During FY 1980, the CEL staff is planning to procure a remote printing terminal linked to the UCSB Computer Center by dedicated modems. This system will enable direct Data Management System file access for searches in an interactive batch mode. The terminal that will be procured in FY 1980 is a Data General DASHER TP2, Model KSR 6077-J. Procurement of the Data General hardware was based on a technical analysis of a number of commercially available printing terminals.

† FAMULUS originally was developed at the University of California, Berkeley, on a CDC 6400. Subsequently, it underwent an IBM 360 conversion at the University of California, Los Angeles (UCLA). At UCLA, a version of FAMULUS was made available to University College, London, whence it was acquired by the UCSB Computer Center. At UCSB, FAMULUS was initially implemented on an IBM 360/75 and a number of significant software enhancements were added. When the IBM 360/75 was replaced with the Itel AS/6, the transfer of FAMULUS to the AS/6 required no conversion. The Itel AS/6 is a plug-compatible processor, equivalent to IBM 370 Systems and an effective replacement for older IBM System/360 models. The CEL Computer Center currently has the capability of two high-speed remote batch terminals connected by dedicated telephone lines to three data centers including an IBM 370/165 operated by the Naval Construction Battalion Center at Port Hueneme, California. The Physical Security Data Management System could be transferred to this 370/165.

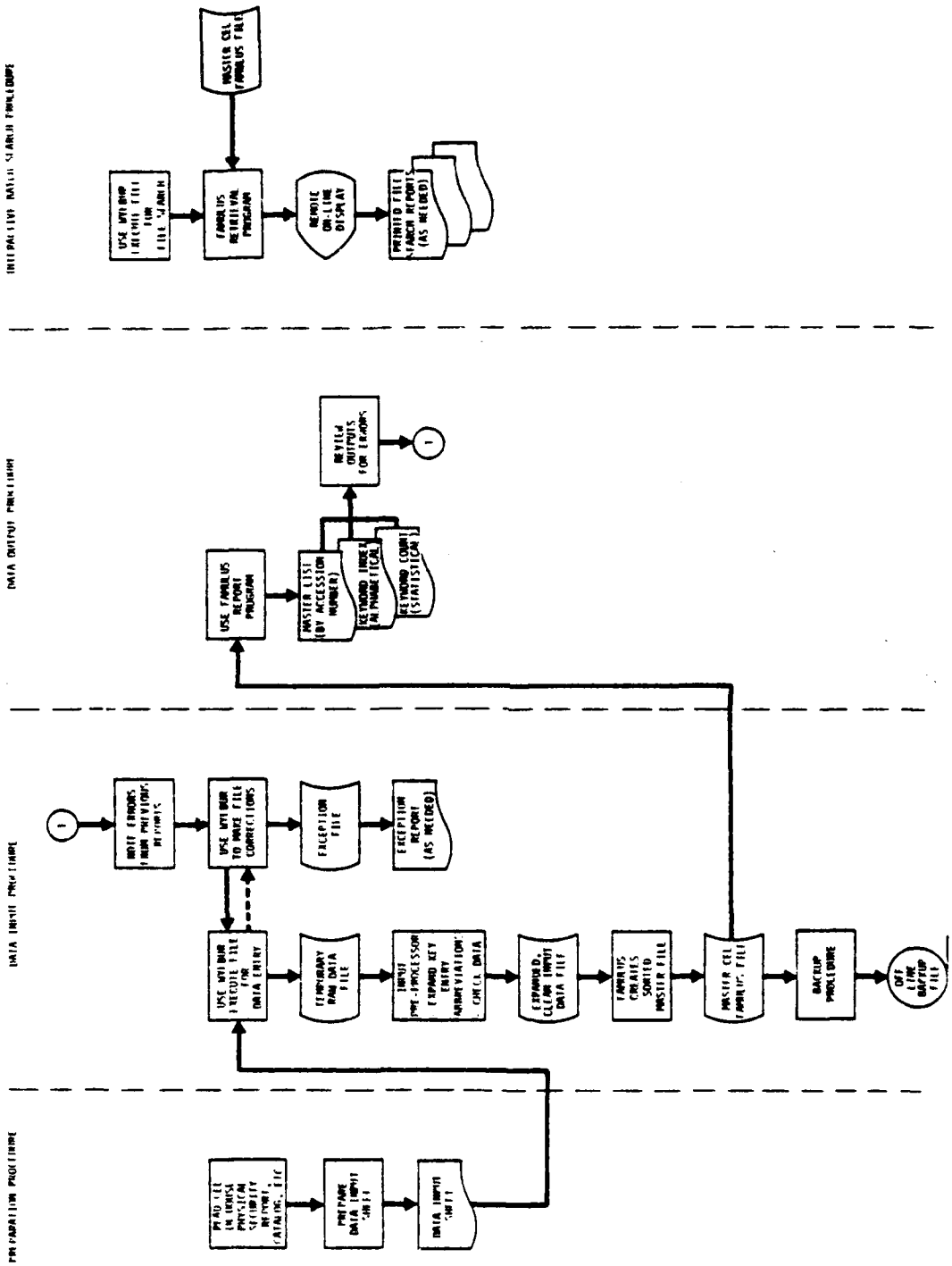


Figure 1. Physical security data management system configuration flowchart.

The lefthand column sequence shown on Figure 1 indicates the data preparation procedure for reading a CEL in-house document and preparing a Physical Security Data Management System Input Sheet. Specific instructions for this procedure are described in Section 3.

The next column sequence indicates the data input procedure for entering a completed Input Sheet into the computer. The procedure consists of keying in specific information for each field through use of an on-line text editing system operating on the Itel AS/6 at the UCSB Computer Center. This system is known as WYLBUR. WYLBUR facilitates entry of bibliographical data into a Temporary Raw Data File, pre-processing of the raw data into an expanded, clean Input Data File, and creation of a Master CEL FAMULUS File as well as an off-line magnetic tape Backup File. Specific instructions for this procedure are described in Section 4.

The next column sequence indicates the data output procedure for generating a printed report. The procedure involves the application of FAMULUS report programs to the records stored in the Master CEL FAMULUS File. Three basic types of reports can be generated: (1) a Master List sorted by accession number, (2) a Keyword Index that is alphabetized, and (3) a Keyword Count that is a statistical listing indicating the frequency with which each keyword appears in the data file sorted both alphabetically and by frequency (high to low in descending order). Specific instructions for this procedure and for interpreting the report outputs are described in Section 5.

The righthand column sequence indicates the interactive batch search procedure for finding specific records according to a variety of search keys, especially keywords. Interactive batch refers to the capability interactively to construct, submit and manipulate jobs, which are processed in a batch mode, and to obtain batch outputs remotely. In other words, a user may enter a search query from a remote terminal (e.g., the

Data General DASHER TP2 terminal after it is procured by the U.S. Navy for the CEL staff). If the computer is not experiencing heavy user teleprocessing traffic, the turnaround time is very short. If the computer has a long queue of jobs, the system can be queried later (e.g., ranging from a few minutes to overnight) and the resultant output can be printed out after the job has been run. This procedure is prospectively outlined in Section 6 and will be fully documented after procurement of the Data General terminal.

SECTION 3
USER INSTRUCTIONS FOR DATA INPUT SHEET

3.1 INPUT SHEET INSTRUCTIONS

The first step after selection of a document for entry into the Physical Security Data Management System is completion of a Data Input Sheet (see Exhibit 1). This form is the key to the successful operation of the information storage and retrieval system. Once the data on the sheet have been entered into an on-line storage file, the user can access by keywords any information about the document recorded in nine of the ten fields. This information includes a full bibliographical citation, a keyword list, useful annotations, an abstract and an accession number with which to find the document in the CEL in-house library.

The Data Input Sheet is divided into ten fields (0-9) as shown in Exhibit 1. Each field is a separate space on the sheet for recording specific information concerning the document or its contents. The paragraphs which follow describe how to complete each field.

3.1.1 Field 0: Accession Number

Each document is first assigned an accession number according to type of document. At present, there are nine types of documents each designated by a two letter alpha prefix as shown below.

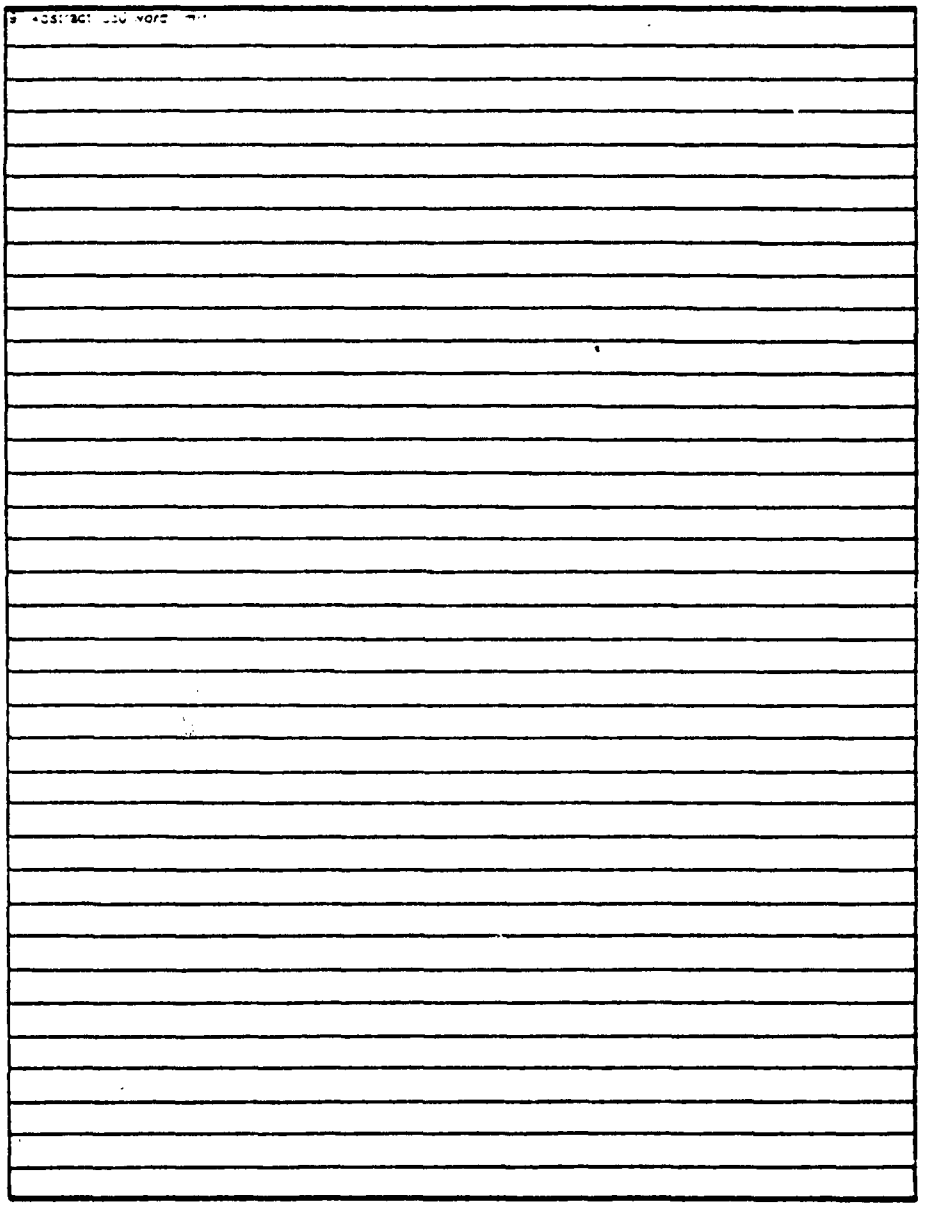
BK - Book

PC - Product Catalog

Exhibit 1. Data input sheet.

PHYSICAL SECURITY DATA MANAGEMENT SYSTEM INPUT SHEET	PHYSICAL SECURITY LABORATORY CIVIL ENGINEERING LABORATORY
1. Accession Number	1a. Year (e.g., 1979)
2. Report Number; Contract Number	
3. Author(s) (Last Name, First Name, Middle Initial; for all authors if multiple)	
4. Title & Page Count (Full title; if part of another document, include title; include page count in parentheses)	
5. Publisher (PB)	
Performing Organization (PO)	
Controlling Office (CO)	
Monitoring Agency (MA)	
6. Keywords (Use DEL Thesaurus Only)	
7. Annotation (Use non-Thesaurus terms to supplement keywords in field 6. Include applicable MIL-Specs, etc.)	
8. Reserve Field (Leave Blank)	

Exhibit 1 (continued)



PE - Periodical

RD - Defense Report

RL - Research Laboratory Report

RT - Reference Text

TN - Technical Note

OR - Other Report

OT - Other

One of the nine prefixes must be selected and then a number assigned (between 00001 and 99999). Numbers are always sequential and left zero filled.* Each of the nine prefixes is defined below.

Book (BK)

A book is any published commercial text dealing with the subject of physical security in any of its aspects. It can be either hardbound or paperback.

Product Catalog (PC)

A product catalog is any brochure, advertisement, or qualitative/quantitative enumeration of items that describes physical security equipment and/or services.

Periodical (PE)

A periodical is any magazine, journal, or serial, published at regular intervals, which relates, directly or indirectly, to physical security.

* With the assignment of an accession number between 1 and 99999, the number is entered in the accession number field, the least significant digit in the rightmost column, and then all other unused columns are filled with zeros, e.g., 00001, 00011, 00111, etc., for 1, 11 and 111, respectively.

Defense Report (RD)

A defense report is any document published by agencies of the Department of Defense (DoD) or the Departments of the Army, Navy, or Air Force. The exception is any report published by a DoD or service laboratory. These reports are classified as research laboratory reports. See the definition below.

Research Laboratory Report (RL)

A research laboratory report is any document published by a U.S. Government or private laboratory, including U.S. military, foreign and international laboratories, engaged in research and development activities. When one or more other categories appear appropriate for classification of a document, this category takes precedence.

Reference Text (RT)

A reference text is any technical, scientific, legal, regulatory, or prescriptive material which relates directly or indirectly to physical security. This category is very broad but includes such materials as Federal statutes, DoD directives, service regulations, military specifications, etc.

Technical Note (TN)

A technical note is any in-house CEL document that does not easily fit into any of the other categories (e.g., progress reports, design notes, and proposals). It does not include published Technical Memoranda or Technical Data Sheets. These documents are research laboratory reports and belong to the RL category.

Other Report (OR)

Other reports are any documents published by a non-DoD agency or other public or private organization which does not fit into the research laboratory category. Research publications of the Federal Bureau of Investigation, the Law Enforcement Assistance Administration and the International Association of Chiefs of Police are examples.

Other (OT)

This category is reserved for published and unpublished material that does not fit into any of the above categories.

3.1.2 Field 1: Year

In this field, record the year of publication followed by the month of publication if shown on the document. Record the full year (e.g., 1979) and the number of the month right justified (*e.g., 07 for July*). Leave one space between the year and the month. It is important to enter the dates in the specified sequence because the FAMULUS program searches by year and then by month.

3.1.3 Field 2: Report Number/Contract Number

In this field, enter any report and/or contract numbers. These numbers must be separated by a semicolon. The report number should be entered first.

3.1.4 Field 3: Author(s)

In this field, enter the full names of all authors. Enter last name first, then first name and middle initial. A semicolon must be

used to separate multiple authors. In the case of a periodical, list all authors of pertinent articles. In the case of a collection of articles or chapters where only an editor is listed, enter the editor's name.

3.1.5 Field 4: Title and Page Count

In this field, enter the full title, then enter a semicolon and then enter the total number of pages in parentheses. If only one article in a journal is cited, the journal title follows the article title and the page count. The volume and number of the journal follow the page count as appropriate separated by a semicolon. If the whole journal is being entered into the system, the pertinent individual titles may be entered in the abstract, Field 9, and the name of the journal will suffice for the title.

3.1.6 Field 5: Publisher

In this field, enter the publisher's name. In the three subfields which follow, enter Performing Organization, Controlling Office, and Monitoring Agency as appropriate. These three subfields conform to the instructions for preparation of a Report Documentation Page of a DoD research document (DD Form 1473).* Each of these subfields is defined below.

Performing Organization

For in-house reports, enter the name of the performing activity including agency, division, department, bureau, etc., if appropriate. For contractor or grantee reports, enter the name of the contractor or grantee who prepared the report and identify the appropriate corporate division, school, laboratory, etc., of the author.

* Standards for DNA Scientific and Technical Reports, pp. A-1 and A-2, Defense Nuclear Agency, 16 July 1979.

Controlling Office

Enter the name of the controlling office. The controlling office equates to the funding/sponsoring agency if indicated. Otherwise, leave blank.

Monitoring Agency

This field should be used when the controlling or funding office does not directly administer a project, contract, or grant, but delegates the administrative responsibility to another organization if indicated. Otherwise, leave blank.

3.1.7 Field 6: Keywords

Review the document thoroughly to identify the important contents and concepts which relate to physical security. If an abstract has already been prepared, this is a valuable source. Identify all keywords pertaining to the contents and concepts identified. Enter all keywords which are contained within either the Dataflow Thesaurus* or the Keyword Count Report described in Section 5 below. The Thesaurus and Keyword Count constitute the controlled vocabulary of the Data Management System. This field is the principal source for file searches and the basis of the indexing system. Accordingly, the review should be thorough. Multiple keywords should be separated by semicolons. Interesting words and phrases, which are not appropriate as keywords, but which serve to illuminate the contents of the document, should be held for entry in the next field.

* Indexing Thesaurus, Dataflow Systems, Incorporated, June 1975. Annot: As experience in implementation of the Data Management System is gained, the Thesaurus will be modified to delete and/or include new terms as appropriate.

3.1.8 Field 7: Annotation

In this field, enter any words or phrases that enhance a user's understanding of the document's overall contents. Specific data references are also appropriate here including military specifications. Multiple terms should be separated by semicolons.

3.1.9 Field 8: Reserve Field

This field currently is not being used. Leave blank. The function of this field is being reserved for any future data requirement that may arise.

3.1.10 Field 9: Abstract

The abstract should be a brief, factual summary of the most significant information contained in the document, not to exceed 350 words. It should state the purposes of any research reported, what was learned, and how, and the conclusions obtained. If the report contains a significant bibliography or literature survey, mention the results here. If an abstract is already provided in the document, incorporate language as appropriate, especially if it is a DD Form 1473, as noted above under Field 5.

3.2 OPERATIONAL EXAMPLE

Exhibit 2 provides an example of a completed Data Input Sheet. A recently published CEL Technical Memorandum has been used for this illustration. This particular report includes an entry in every field except, of course, the reserve field, Field 8.

Exhibit 2. Example of completed data input sheet.

8. Abstract (250 word limit)

Provides graphic documentation of (1) installation procedures for heavy steel doors, hollow doors and inward opening personnel doors; (2) an emergency forcible entry; (3) hardware components of hasp/lock systems; (4) tests of various attack methods; (5) engineering drawings of the MK 2 Mod 7 high-security hasp.

PHYSICAL SECURITY DATA MANAGEMENT SYSTEM
INPUT SHEET

PHYSICAL SECURITY LABORATORY
CIVIL ENGINEERING LABORATORY

0. Accession Number: RL00033

Year (E.g., 1979): 1978 07

1. Report Number/Contract Number: 61-78-8; 61.928

3. Author(s) Last Name, First Name, Middle Initial (For all authors if multiple):
GRAY, K. O.

4. Title & Page Count (For title of part or another document, include title, include page count in parentheses):
PHOTOGRAPHIC DOCUMENTATION OF HIGH-SECURITY SHROUDED HASP SYSTEM DEVELOPMENT
(53)

5. Publisher (PB):
CIVIL ENGINEERING LABORATORY
NAVAL CONSTRUCTION BATTALION CENTER

Performing Organization (PO):
CIVIL ENGINEERING LABORATORY
NAVAL CONSTRUCTION BATTALION CENTER

Controlling Office (CO):
CIVIL ENGINEERING LABORATORY
NAVAL CONSTRUCTION BATTALION CENTER

Monitoring Agency (MA):
NAVAL SEA SYSTEMS COMMAND

6. Keywords (Use DSIT Thesaurus Only):
LOCKS; HASPS; LOCK ATTACK; FORCED ENTRY METHODS; LOCK PARTS; LOCK TYPES; DOORS; LOCK TECHNOLOGY; METHODS OF ENTRY; BUILDERS HARDWARE; TYPES OF ENTRY, THREATS

7. Annotation (Use non-Thesaurus terms; Supplement Keywords and Abstract; Include applicable dates, etc.):
MIL-H-29181-(YD); HIGH-SECURITY HASP; HIGH AND MEDIUM SHROUDED SECURITY PADLOCK

9. Reserve Field (Leave Blank):

Exhibit 3 provides an example of the computer file listing that results from the entry of information recorded on the Data Input Sheet. Abbreviations for the appropriate fields are labeled on the exhibit. The user can easily match Data Input Sheet fields and computer output formats. All fields except Field 8 (Reserve Field) are printed as output.

3.3 PHYSICAL SECURITY DATA MANAGEMENT SPECIALIST

Complete implementation of the data input procedures of the Physical Security Data Management System would be facilitated by someone trained specifically in the fields of information systems and library and archival science. A job description was prepared with this purpose in mind.

The position of Physical Security Data Management Specialist involves the interdisciplinary application of library science technology, information systems technology, and archival science technology for the purposes of serving the in-house RDT&E needs of the CEL Physical Security Laboratory staff. Specific job functions include:

1. Performance of detailed, routine, and clerical library duties pursuant to a prescribed set of methods and procedures for the storage, retrieval, and preservation of technical documentation including government reports, contractor reports, professional books, vendor catalogs, commercial equipment specifications, government specifications (including military specifications and standards), technical data sheets, and the like, related to physical security.
2. Performance of detailed, routine and clerical library duties such as cataloging, coding, summarizing, cross-referencing, annotating, citing and abstracting of technical documentation.

Exhibit 3. Example of computer listing of document after data entry and report generation.

```
PAGE   52                 MASTER LIST - CEL BIBLIOGRAPHY

          disses, and the structures must be quickly erected
          and easily relocated. This report presents methods
          for the comparison and evaluation of alternate
          protective concepts.

148   ACNO  BL00033
      YEAR  1978 07
      RCNO  01-78-8;61.028
      AUTH  Gray, K.O.
      TITL  Photographic Documentation of High Security Shrouded
            Hasp System Development (53)
      PUBL  Performing Organization: Civil Engineering
            Laboratory, Naval Construction Battalion Center;
            Controlling Office: Civil Engineering Laboratory,
            Naval Construction Battalion Center; Monitoring
            Agency: Naval Sea Systems Command
      KEYW  Locks; Hasps; Lock Attacks; Forced Entry Methods;
            Lock Parts; Lock Types; Doors; Lock Technology;
            Method of Entry; Builders Hardware; Types of Entry,
            Threats
      NOTE  MIL-H-29181-(YD); High Security Hasp; High and Medium
            Shrouded Security Padlock
      ABST  Provides graphic documentation of (1) Installation
            procedures for heavy steel doors, hollow doors and
            inward opening personnel doors; (2) An emergency
            forcible entry method; (3) Hardware components of
            hasp/lock systems; (4) Tests of various attack
            methods; (5) Engineering drawings of the M4 2 Mod 7
            high-security hasp.

149   ACNO  BL00034
      YEAR  1977 01
      RCNO  TN-1469
      AUTH  Gray, K.O.
      TITL  Externally Generated Light (EGL) Systems for
            Hyperbaric/Hypobaric Chambers (51)
      PUBL  Performing Organization: Civil Engineering
            Laboratory, Naval Construction Battalion Center
            Controlling Office: Naval Facilities Engineering
            Command Monitoring Agency: Naval Facilities
            Engineering Command
      KEYW  Lighting; Exterior Lighting; Interior Lighting;
            Builders Hardware
      NOTE  Lighting System; Diver; Recompression Chamber;
            Hyperbaric Chamber; Illumination; Viewport
      ABST  Lighting systems for hyperbaric/hypobaric chambers
            are described. Methods of interior illumination
            without introduction of any potential fire source in
            the chamber are presented. The systems utilize light
            generated outside the chamber environment, filtered
            for reduction of infrared radiation.

150   ACNO  BL00035
      YEAR  1977 12
      RCNO  TN-1509; DN687075
      AUTH  Lorman, William R.
      TITL  Assessment of Various Constructional Materials as
```

3. Performance of detailed, routine and clerical archival duties pursuant to a prescribed set of methods and procedures for accessing, arranging, describing, preserving, using, and disposing of technical archives, including the technical documentation described in items 1 and 2 above.

4. Performance of data input, data entry, and data output retrieval relating to automated storage and retrieval of data from on-line or batch files containing bibliographies, citations, abstracts, and related summary information about the principal areas of physical security systems and physical security technology according to keywords. The performance of these functions entails the use of general knowledge of the steps required to utilize computerized information systems as an "end user," i.e., the knowledge of external steps, processes, and user procedures rather than internal machine steps, language, and programs.

In developing the job description, consultations were sought with the Civilian Personnel Office of the Defense Nuclear Agency.* Position Classification Standards were reviewed as prescribed by the U.S. Civil Service Commission. Three different positions were analyzed: (1) Library Technical Series (GS-1411-4-6), (2) Computer Aid and Technician Series (GS-335), and (3) Archives Technician Series (GS-1421-1-7). While none of these positions fits precisely the kind of job position which is described above, the position of Physical Security Data Management Specialist is an "amalgam" consisting of part librarian, part computer specialist (or information systems specialist), and part archives technician. The position

* Meeting between Mr. Ron Rothberg, Civilian Personnel Office, Defense Nuclear Agency (DNA) and Dr. John Caldwell, Mission Research Corporation, at DNA, Washington, D.C., 12 May 1979.

defined above is a combination of the job functions specified in the Civil Service categories mentioned above and most accurately approaches the functional requirements of the CEL Physical Security Laboratory staff.

SECTION 4
USER INSTRUCTIONS FOR REMOTE DATA ENTRY

4.1 DATA ENTRY INSTRUCTIONS

Once a Data Input Sheet has been completed, the information can then be entered into the computerized Data Management System for on-line storage and retrieval. Remote data entry is accomplished through use of a terminal, either a cathode-ray tube (CRT) or printer, with a standard keyboard. For purposes of illustration, a small, portable Texas Instrument 700 (TI 700) electronic data terminal has been used. This procedure will be updated after procurement, installation and checkout of the Data General DASHER TP2 terminal at the CEL Physical Security Laboratory.

As noted earlier, data entry is facilitated through use of a computer program known as WYLBUR operating on the UCSB Itel AS/6. WYLBUR is an on-line text editing system that permits direct access and interaction with data files. The data entry procedure is structured around WYLBUR basic commands.

Exhibit 4 is an example of a record entry from a TI 700 printing terminal using WYLBUR. Where appropriate, lines of output are numbered and circled on the exhibit. These circled numbers match similar designations in the text below so that the user can refer to the example as he reads the procedure step-by-step.

To access WYLBUR, once the terminal is connected via the TI 700's acoustic coupler to a WYLBUR telephone line at the UCSB Computer Center,

Exhibit 4. Example of record entry from TI 700 terminal using WYLBUR.

```
  UCSB LINE 3 09:50:57 10/22/79 (73.295)

  WYLBUR ACCOUNT? @@@@
(1)WYLBUR ACCOUNT? @@@@ CALDWELL
(2)PASSWORD? @@@@@@@@
(3)COMMAND? COLLECT
      1.(4) ?
      2.(5) ? ACNO RL00033
      3.(6) ? YEAR 1978 07
      4.(7) ? RCNO 61-78-8:61.028
      5.(8) ? AUTH GRAY, K. O.
      6.(9) ? TITL PHOTOGRAPHIC DOCUMENTATION OF HIGH-SECURITY SHROUDED
      7.    ?       HASP SYSTEM DEVELOPMENT (53)
      8.(10)? PUBL CIVIL ENGINEERING LABORATORY, NAVAL CONSTRUCTION
      9.    ?       BATTALION CENTER; PD: CIVIL ENGINEERING LABORATORY,
     10.    ?       NAVAL CONSTRUCTION BATTALION CENTER; CD: CIVIL
     11.    ?       ENGINEERING LABORATORY, NAVAL CONSTRUCTION BATTALION
     12.    ?       CENTER; MA: NAVAL SEA SYSTEMS COMMAND
     13.(11)? KEYW LOCKS; HASPS; LOCK ATTACK; FORCED ENTRY METHODS; LOCK
     14.    ?       PARTS; LOCK TYPES; DOORS; LOCK TECHNOLOGY; METHODS OF
     15.    ?       ENTRY; BUILDERS HARDWARE; TYPES OF ENTRY, THREATS
     16.(12)? NOTE MIL-H-29181-(YD); HIGH-SECURITY HASP; HIGH AND MEDIUM
     17.    ?       SHROUDED SECURITY PADLOCK
     18.(13)? ABST PROVIDES GRAPHIC DOCUMENTATION OF (1) INSTALLATION
     19.    ?       PROCEDURES FOR HEAVY STEEL DOORS, HOLLOW DOORS AND
     20.    ?       INWARD OPENING PERSONNEL DOORS; (2) AN EMERGENCY
     21.    ?       FORCIBLE ENTRY METHOD; (3) HARDWARE COMPONENTS OF
     22.    ?       HASP/LOCK SYSTEMS; (4) TESTS OF VARIOUS ATTACK
     23.    ?       METHODS; (5) ENGINEERING DRAWINGS OF THE MK 2 MOD 7
     24.    ?       HIGH-SECURITY HASP.

(14)COMMAND? LOGOFF
(15)OK TO CLEAR? OK
  0.03 SECONDS EDITING TIME
  0 PAGE READS, 10 PAGE WRITES
  2 DISK READS, 0 DISK WRITES
  ELAPSED TIME = 00:09:31
  CHARGE FOR THIS SESSION = $0.34
  FUNDS REMAINING:ACCOUNT $225.05
                  WYLBUR UNLIMITED
                    NAME UNLIMITED
  END OF SESSION
```

the user must first identify himself. This process is called a "log-on." The basic information required for WYLBUR access is a WYLBUR account number, a user name and a user password.

The first step is to press the red return key on the TI 700 keyboard. The user will then be prompted by the query "WYLBUR ACCOUNT?"[1] to which the user should reply by typing his identification code. The overprinting shown on three exhibit fields is deliberate and insures that no one can gain unauthorized access to the user's WYLBUR files by casually examining the user's account number, name and password. Once the account number and name are entered, the return key should again be pressed. The next prompt will be "PASSWORD?"[2] to which the user should reply by typing his specific password. The user should press the return key. The next prompt will be "COMMAND?"[3] which signifies that the user is successfully logged on.

WYLBUR has a "COLLECT" and a "COMMAND" mode. For purposes here, the user need only be concerned with the "COLLECT" mode. This will collect and save the text as it is entered. When the user is prompted with "COMMAND?" he should type in "COLLECT"[3] and press the return key. The "1" that appears indicates that WYLBUR will start collecting on line "1." It is at this point that the user can start to enter data from the Data Input Sheet. For ease of notation, let (RT) indicate the return key and (SP) indicate the space key.

[4]Start every record with a blank line.

[5]Start with the zero (0) field (accession number) on the Data Input Sheet. Type ACNO (SP) and the number (RT).

[6]The first (1) field is year. Type YEAR (SP), the year (SP), the month, if appropriate, and (RT).

[7]The second (2) field is report and contract number. Type RCNO (SP) report number; contract number (RT).

[8]The third field is author, type AUTH(SP), the author(s) (multiple authors are separated by a semicolon) and (RT).

[9]The fourth field is the title. Type TITL (SP), the title (SP), and page count in parentheses and (RT).

[10]The fifth field is publisher. Type PUBL (SP), the publisher; (SP) PO: the performing organization; (SP) CO: the controlling office; (SP) MA: the monitoring agency (RT).

[11]The sixth field is keywords. Type KEYW (SP), the keywords, all separated by semicolons and (RT).

[12]The seventh field is annotation. Type NOTE (SP), the appropriate words and phases, separated by semicolons and (RT).

[13]The ninth field is the abstract.* Type ABST (SP), the contents and (RT).

At this point you will have completed the entry for one record. To enter another record, skip a line (RT) and begin with ACNO again. If a field on a Data Input Sheet is empty, begin immediately with the next field that contains information.

When the data entry is completed, the user must get out of the "COLLECT" mode and execute the commands that will save the file and log off the system. When a user wishes to enter more data at a later date, WYLBUR will return to the point of previous termination.

To get out of the "COLLECT" mode, hold down the key marked "CTRL" and press the "D" key. This will interrupt the collection and prompt with "COMMAND?"[14] At this point the user may return to the "COLLECT" mode or he may log off. The user's reply to the prompt will determine the result.

* The eighth field is the reserve field which is not currently being used. As noted on page 19, it should be left blank.

To reserve the data that have been entered, the user must use the "SAVE" command so that he can retrieve and add to the file.

When the user completes entry of a record (or set of records) and has returned to the "COMMAND" mode, he should type SAVE (SP), name of the file* (SP) ON (SP) name of the disk pack[†] (RT). He will be prompted with "COMMAND?" again. To this, he should reply "LOGOFF" (RT). WYLBUR will then ask "OK TO CLEAR?"[15] The appropriate response is "OK" (RT). The user is now off the system and the work is reserved until he wishes to retrieve it, update it, etc.

When the user wishes to retrieve and add to the file, he should follow the instructions for logging on. When prompted with "COMMAND?" he should type "USE" (SP), the file name (SP) ON (SP) name of disk pack (RT) (e.g., use TMNO ON WYL1B2). To the next "COMMAND" he should then reply "COLLECT" and WYLBUR will return to the point of previous termination and more data may be entered.

4.2 WYLBUR USER INFORMATION

Every user of the Physical Security Data Management System should keep a permanent record of basic WYLBUR user information. Table 1 is a format for this purpose. It includes the WYLBUR direct dial number at the UCSB Computer Center for use of the TI 700 terminal, the user's WYLBUR account number, the user's WYLBUR password, and the user's WYLBUR file designation.

---

* Name of the file should be eight characters or less.

† To be determined at a later date.

Table 1. WYLBUR user reference information.

CEL STAFF USER	WYLBUR DIRECT DIAL NUMBER	WYLBUR ACCOUNT #	WYLBUR PASSWORD	WYLBUR FILE NAME
	(805) 685-5411			
	(805) 685-5411			
	(805) 685-5411			
	(805) 685-5411			
	(805) 685-5411			
	(805) 685-5411			

SECTION 5
DESCRIPTION OF SYSTEM OUTPUTS

5.1 OVERVIEW OF SYSTEM OUTPUTS

The instructions thus far in this User's Manual have addressed the what and the how of on-line file building. This section addresses the outputs that the FAMULUS computer programs can produce once a raw data file has been constructed.

Figure 2 is a presentation of the Data Management System data output procedure in more detail. It expands upon the overview of the system shown in Figure 1. Currently, there are one Input Pre-Processor program and five FAMULUS programs that are used to produce system outputs. The flowchart of FAMULUS programs and outputs in Figure 2 displays the principal program capabilities and outputs of the system.

As explained in Sections 3 and 4, the completion of Data Input Sheets and the accumulated input of these bibliographical records into WYLBUR on-line storage result in the creation of a temporary WILBUR Raw Date File. The Input Pre-Processor program converts this raw file into an expanded Input Data File. The FAMULUS Edit Program then produces an Edited FAMULUS File. In turn, the FAMULUS Sort Program produces a Master CEL FAMULUS File.

Application of three additional FAMULUS programs produces the principal batch outputs of the Data Management System. The FAMULUS Galley Program produces the Master List of all bibliographical records sorted by accession number.

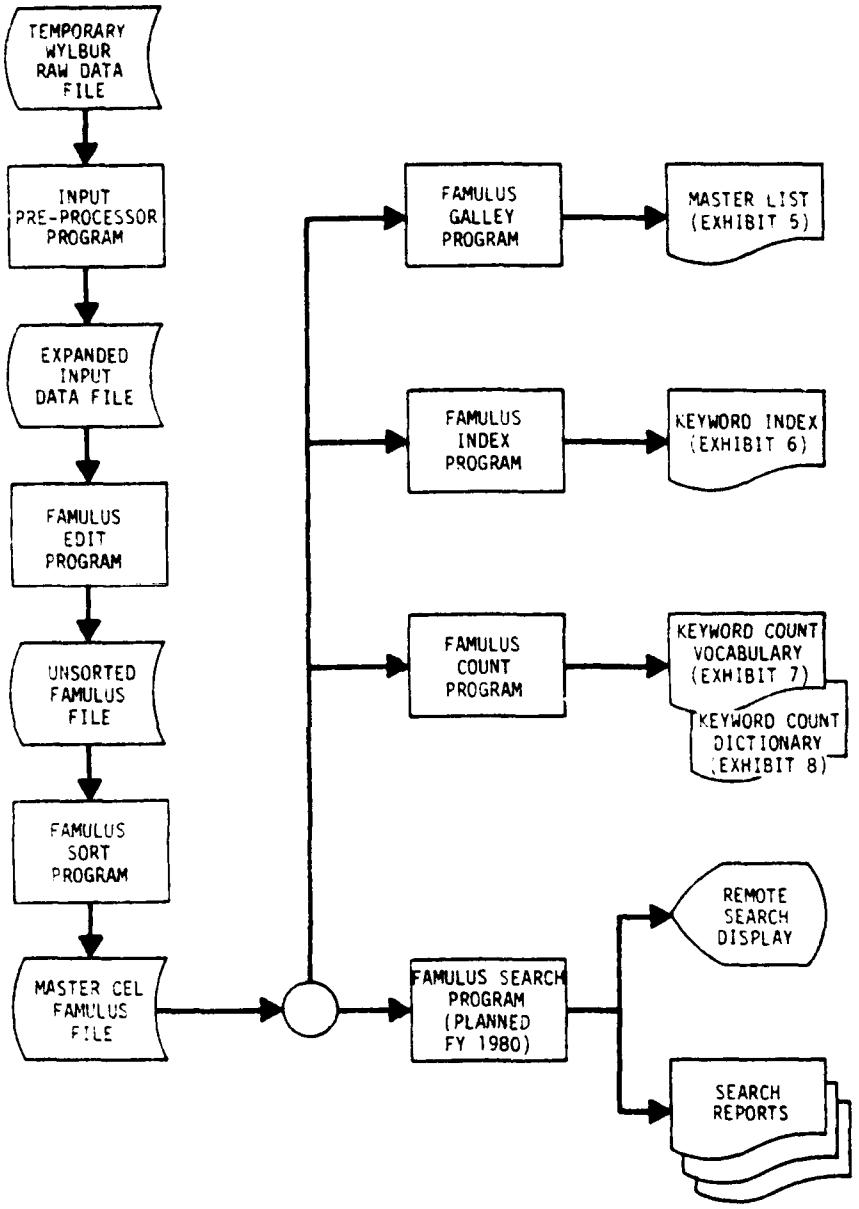


Figure 2. FAMULUS computer programs and outputs flowchart.

The FAMULUS Index Program produces the Keyword Index, an alphabetized list of all keywords and, for each keyword, a list of all bibliographical record numbers in the Master List where such keywords appear in the keyword field (Field 6 of the Data Input Sheet).

The FAMULUS Count Program produces two statistical reports: (1) a Keyword Count (subtitled Vocabulary) consisting of an alphabetized list of all keywords and, for each keyword, the absolute and percentage frequencies among all keywords, and (2) a Keyword Count (subtitled Dictionary) consisting of a list of all keywords sorted by frequency from highest to lowest.

Examples of a Master List output, a Keyword Index output, a Keyword Count (Vocabulary) output, and a Keyword Count (Dictionary) output are shown in Exhibits 5-8, respectively.

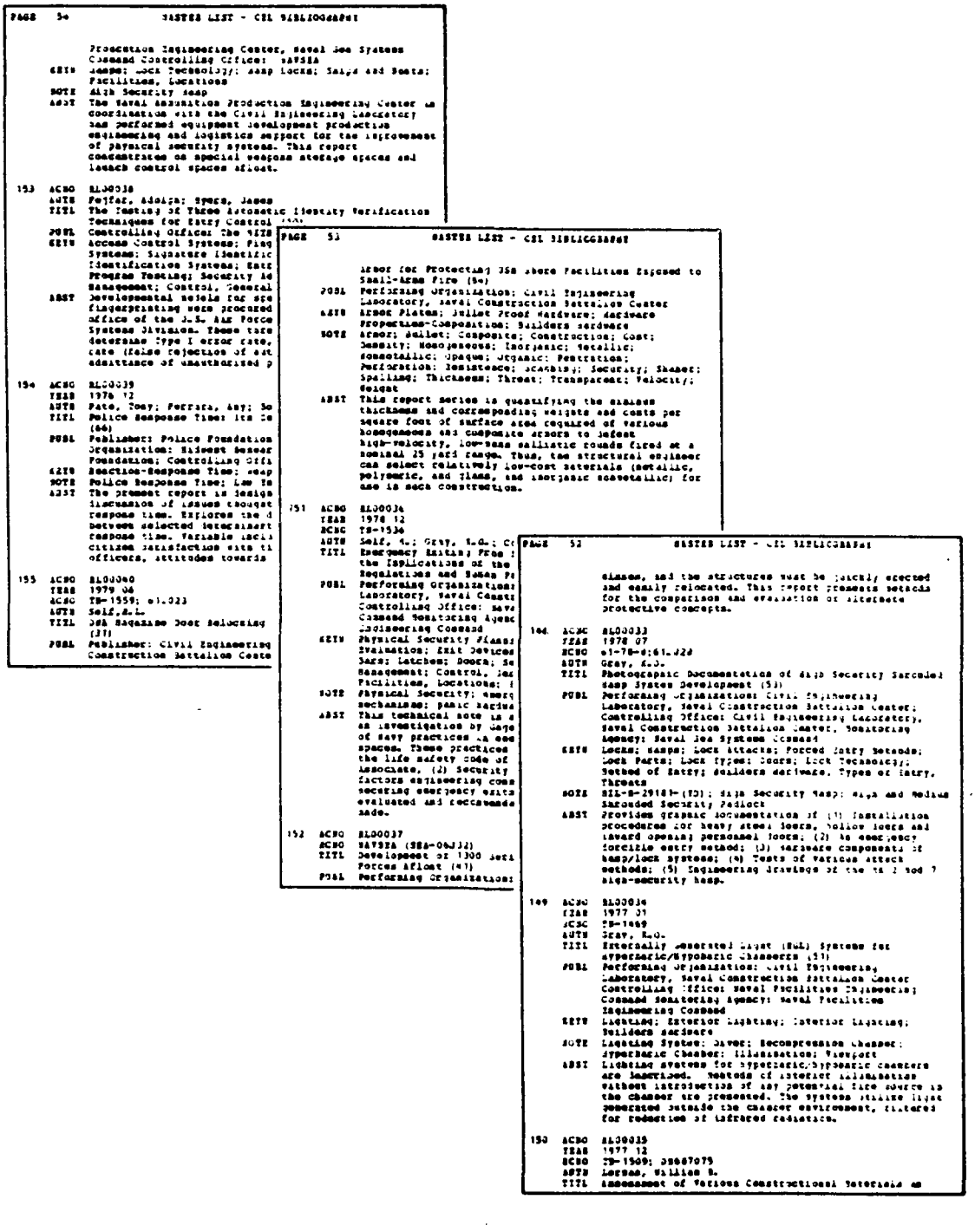
The FAMULUS Search Program, when implemented in FY 1980, will be capable of yielding remote terminal displays of file searches as well as batch search reports as needed.

Instructions on how to read and interpret each of the batch outputs is set forth in the subsections below.

5.2 MASTER LIST

Exhibit 5 is an excerpt from the Master List showing pages 51-53 in a cascade. Coinciding with the example of the record shown in Exhibit 3, Record Number 148 on page 52 is a typical record output. It is the computerized version of the Data Input Sheet. All fields have been printed except the Reserve Field (Field 8 on the Data Input Sheet). It should be noted that the particular record shown has been assigned 11 separate keywords or phrases. This record can be accessed from the Master List by index reference in the Keyword Index to any one of the 11 keywords.

Exhibit 5. Master list utilization



PAGE 54 MASTER LIST - CEL 81BLIOGRAPHY

Production Engineering Center, Naval Sea Systems Command Controlling Office: NAVSEA

KEYW Keeps; Lock Technology;; Keep Locks; Safes and Boats; Facilities, Locations

NOTE High Security Keep

ABST The Naval Ammunition Production Engineering Center in coordination with the Civil Engineering Laboratory has performed equipment development production engineering and logistics support for the improvement of physical security systems. This report concentrates on special weapons storage spaces and launch control spaces afloat.

153 ACNO BL00038
AUTH Pelfer, Adolph; Speer, James
TITL The Testing of Three Automatic Identity Verification Techniques for Entry Control (U)
PUBL Controlling Office: The NITE
KEYW Access Control Systems; Fing Systems; Signature Identific Identification Systems; Entr Program Testing; Security Ad Management; Control, General
ABST Developmental models for spe fingerprinting were procured office of the U.S. Air Force Systems Division. These were determined Type I error rate, rate (false rejection of aut admittance of unauthorized p

154 ACNO BL00039
YEAR 1976 12
AUTH Pate, Tony; Ferrara, Amy; Sc
TITL Police Response Time: Its Me (66)
PUBL Publisher: Police Foundation Organization: Midwest Researc Foundation; Controlling Offi
KEYW Reaction-Response Time; Keep
NOTE Police Response Time; Law En
ABST The present report is design elucidation of issues thought response time. Explores the d between selected determinant response time. Variable inclu citizen satisfaction with ti officers, attitudes towards

155 ACNO BL00040
YEAR 1979 06
ACSC TR-1559; e1.023
AUTH Self,A.L.
TITL DSA Hazardous Door Relocking (U)
PUBL Publisher: Civil Engineering Construction Battalion Cente

PAGE 53 MASTER LIST - CEL BIBLIOGRAPHY

Armor for Protection) 35A shore Facilities Exposed to Small-Arms Fire (U)
PUBL Performing Organization: Civil Engineering Laboratory, Naval Construction Battalion Center
KEYW Armor Plates; Bullet Proof Hardware; Hardware Properties-Composition; Builders Hardware
NOTE Armor; Ballet; Composite; Construction; Cost; Density; Homogeneous; Inorganic; Metallic; Nonmetallic; Opaque; Organic; Penetration; Perforation; Resistance; Scarcity; Security; Sheets; Spalling; Thickness; Threat; Transparent; Velocity; Weight
ABST This report series is quantifying the minimum thickness and corresponding weights and costs per square foot of surface area required of various homogeneous and composite armors to defeat high-velocity, low-mass ballistic rounds fired at a nominal 25 yard range. Thus, the structural engineer can select relatively low-cost materials (metallic, polymeric, and glass, and inorganic nonmetallic) for use in mass construction.

151 ACNO BL00036
YEAR 1978 12
ACSC TR-1534
AUTH Self, A.; Gray, R.O.; Cc
TITL Emergency Exits; Free the Implications of the Regulations and Keep Pa
PUBL Performing Organization: Laboratory, Naval Constr Controlling Office: Navy Command Monitoring Agenc Engineering Command
KEYW Physical Security Plans; Evaluation; Exit Devices Bars; Latches; Doors; Se Management; Control, Ser Facilities, Locations; E
NOTE Physical Security; Emerg mechanisms; Panic Bardw
ABST This technical note is a an investigation by Naval of Navy practices in ene spaces. These practices the life safety code of Associate, (2) Security factors engineering cons securing emergency exits evaluated and recommenda made.

152 ACNO BL00037
ACNO NAVSEA (SEA-06J32)
TITL Development of 1300 Watt Forces Afloat (U)
PUBL Performing Organization:

PAGE 52 MASTER LIST - CEL BIBLIOGRAPHY

closure, and the structures must be quickly erected and easily relocated. This report presents methods for the comparison and evaluation of alternate protective concepts.

146 ACNO BL00033
YEAR 1978 07
ACNO e1-78-e;61.022
AUTH Gray, R.O.
TITL Photographic Documentation of High Security Barricaded Hasp System Development (U)
PUBL Performing Organization: Civil Engineering Laboratory, Naval Construction Battalion Center; Controlling Office: Civil Engineering Laboratory, Naval Construction Battalion Center, Monitoring Agency: Naval Sea Systems Command
KEYW Locks; Hasps; Lock Attacks; Forced Entry Methods; Lock Parts; Lock Types; Doors; Lock Technology; Method of Entry; Builders Hardware, Types of Entry, Threats
NOTE NIL-8-29181-(TD); High Security Hasp; High and Medium Barricaded Security; Padlock
ABST Provides graphic documentation of (1) Installation procedures for heavy steel doors, hollow locks and inward opening personnel doors; (2) No emergency forcible entry method; (3) Hardware components of hasp/lock systems; (4) Tests of various attack methods; (5) Engineering drawings of the 'A' and 'B' High-security hasp.

149 ACNO BL00030
YEAR 1977 01
ACNO TR-1469
AUTH Gray, R.O.
TITL Internally Mounted Light (IML) Systems for Hyperbaric/Hypobaric Chambers (U)
PUBL Performing Organization: Civil Engineering Laboratory, Naval Construction Battalion Center Controlling Office: Naval Facilities Engineering Command Monitoring Agency: Naval Facilities Engineering Command
KEYW Lighting; Exterior Lighting; Interior Lighting; Builders Hardware
NOTE Lighting System; Navy; Decompression Chamber; Hyperbaric Chamber; Illumination; Viewport
ABST Lighting systems for hyperbaric/hypobaric chambers are described. Methods of interior illumination without introduction of any potential fire source in the chamber are presented. The systems utilize light generated outside the chamber environment, filtered for reduction of infrared radiation.

150 ACNO BL00035
YEAR 1977 12
ACNO TR-1509; D3067075
AUTH Lorman, William R.
TITL Assessment of Various Constructional Materials an

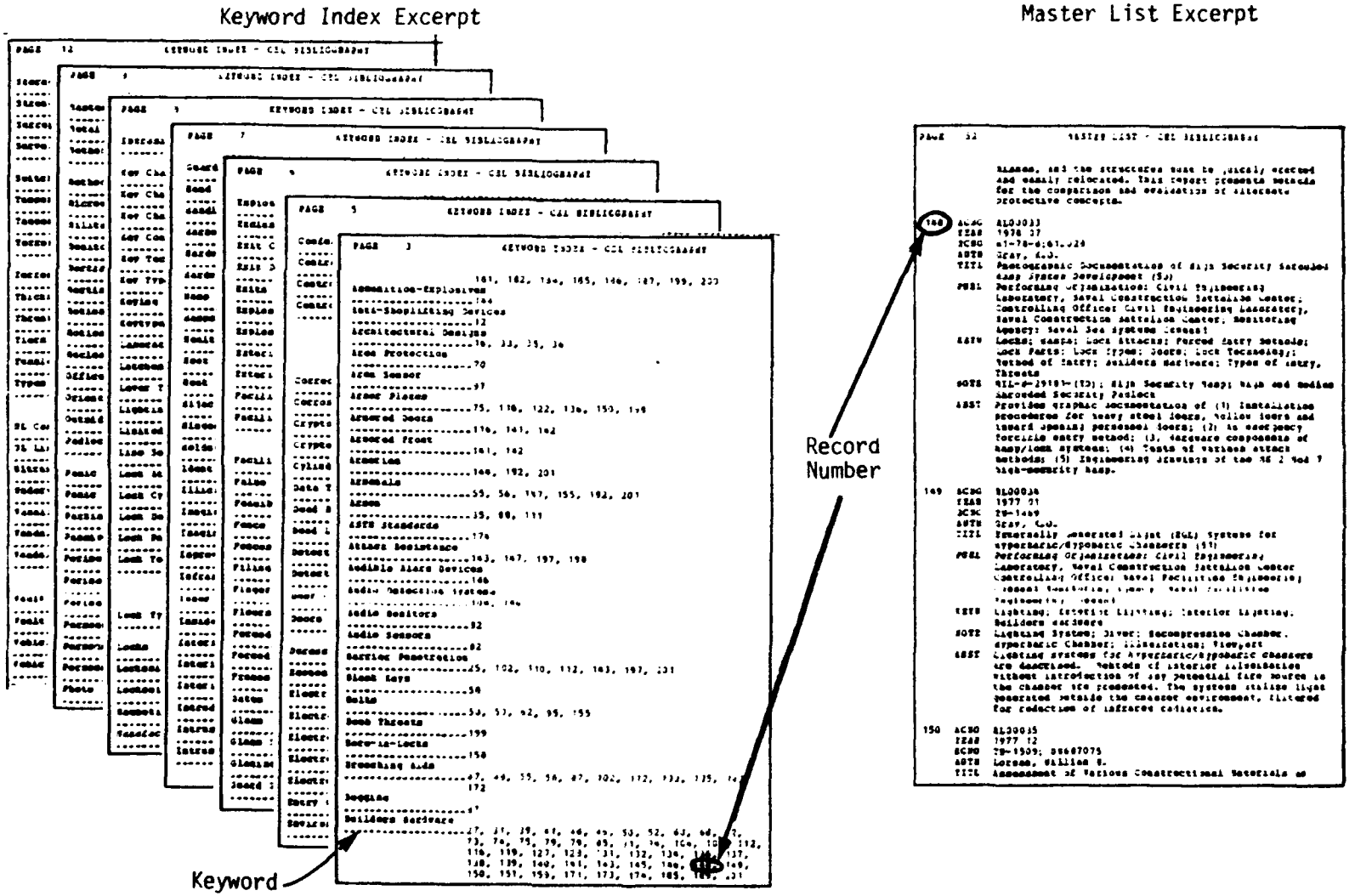
5.3 KEYWORD INDEX

Exhibit 6 shows excerpts from the Keyword Index and the Master List outputs. On the lefthand side of the exhibit is shown a cascade of seven of the pages in the Keyword Index on which all 11 of the keywords of Record Number 148 appear. On the righthand side of the exhibit is page 52 of the Master List showing Record Number 148. This record can be accessed by referring to the keywords and record numbers in the Keyword Index which appear in 11 separate entries.

To find a bibliographical entry (or a set of entries) pertaining to a particular keyword, the user should first find the keyword listed alphabetically in the Keyword Index as shown in the example on the lefthand side of Exhibit 6. One of the keywords associated with the bibliographical entry dealing with high security shrouded hasps, shown as Record Number 148 on the righthand side of the exhibit, is Builders Hardware in the alphabetical sequence of keywords. Opposite the keyword entry is a list of Record Numbers including Record Number 148 which is circled. By looking up Record Number 148 in the Master List, the user can find the complete bibliographical entry as illustrated on both Exhibits 5 and 6, i.e., the full citation and abstract of the CEL report on high security shrouded hasps. This same report could have been accessed by 10 other keywords including Doors; Forced Entry Methods; Hasps; Lock Attack; Lock Parts; Locks; Lock Technology; Lock Types; Method of Entry; and Types of Entry, Threats. Each of these keywords is listed on the other pages shown in the Exhibit 6 cascade.

By consulting more than one keyword (as appropriate) the user can manually reduce (or focus) the number of Record Numbers to be read on the Master List by recording on a separate sheet of paper only those Record Numbers which appear under two (or more) different keywords. As long as the list of Record Numbers is not too long, the user will not find

Exhibit 6. Keyword index application



Keywords (N=11): Builders Hardware; Doors; Forced Entry Methods; Hasps; Lock Attack; Lock Parts; Lock Technology; Lock Types; Locks; Methods of Entry; Types of Entry, Threats.

this "intersection" process cumbersome. If the number of keywords is long or the list or Record Numbers is too lengthy, then an interactive batch search should be initiated using the remote terminal search procedure. The scope of this procedure is outlined in Section 6 below.

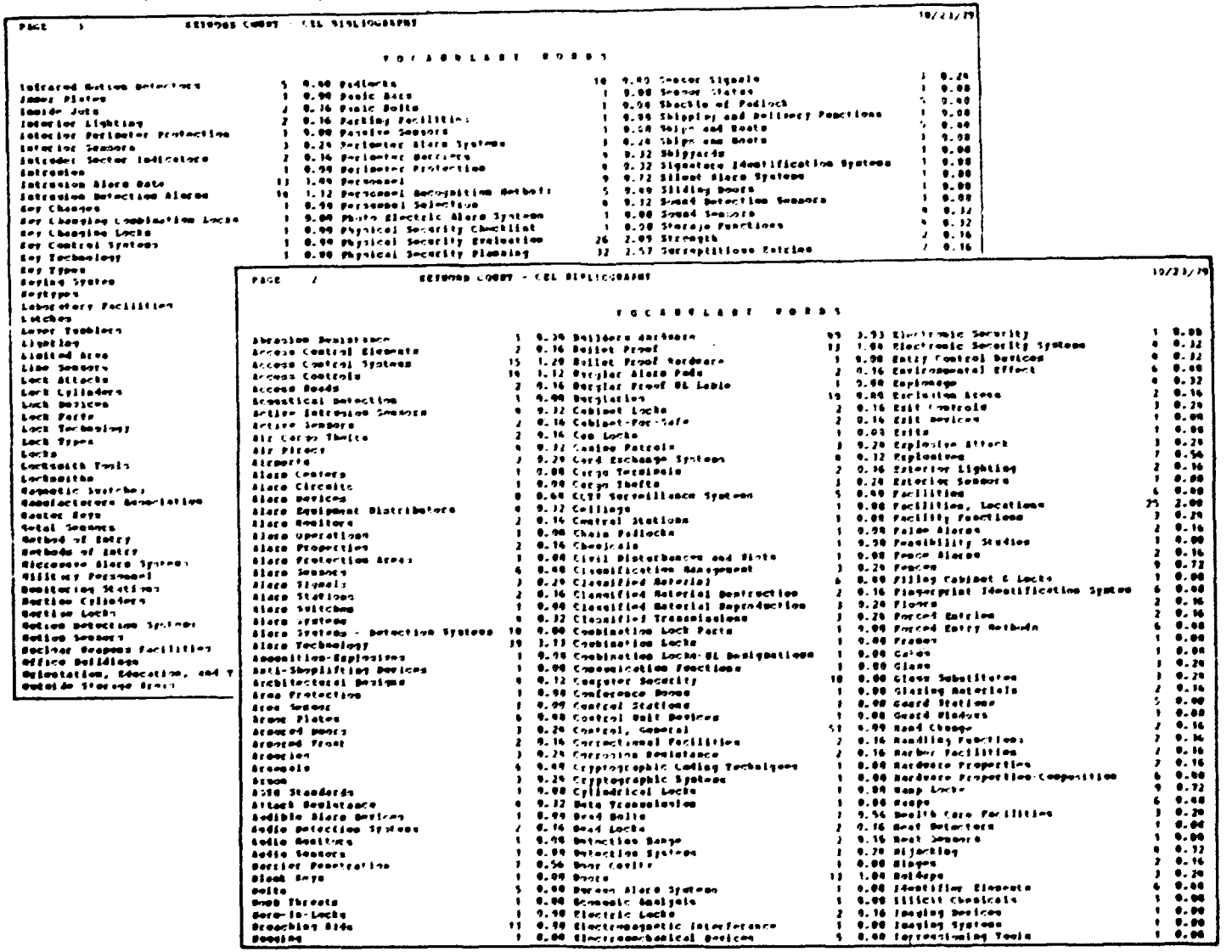
5.4 KEYWORD COUNT

Exhibit 7 shows a cascade of the current list of keywords presented alphabetically. Opposite each word is the absolute number of times the keyword appears in separate Master List records followed by the percentage of this frequency. This output is useful in two respects. It provides the user with a complete list of the keywords, or the controlled vocabulary, of the Data Management System by which records can be accessed. It also provides statistical insight into how frequently specific words and phrases appear throughout the bibliographical records of the system.

Exhibit 8 shows a similar cascade of the current list of keywords arranged by frequency from highest to lowest. Opposite each word is the absolute number of times the keyword appears in separate Master List records followed by the percentage of this frequency. For example, the term "Control, General," one of the major categories in the Dataflow Indexing Thesaurus, is currently the most frequently used keyword in the Data Management System (N = 51). In other words, the keyword, Control, General (referring broadly to physical security control equipment), appears as a keyword entry in 51 different records or in 25 percent of the current records stored in the Data Management System.*

* Currently, there are 201 separate bibliographical records in the CEL Physical Security Data Management System.

Exhibit 7. Keyword count, controlled vocabulary terms listed alphabetically.



PAGE 1 SECOND COUNT - CEL DISCLOSURE 10/23/79

VOCABULARY WORDS

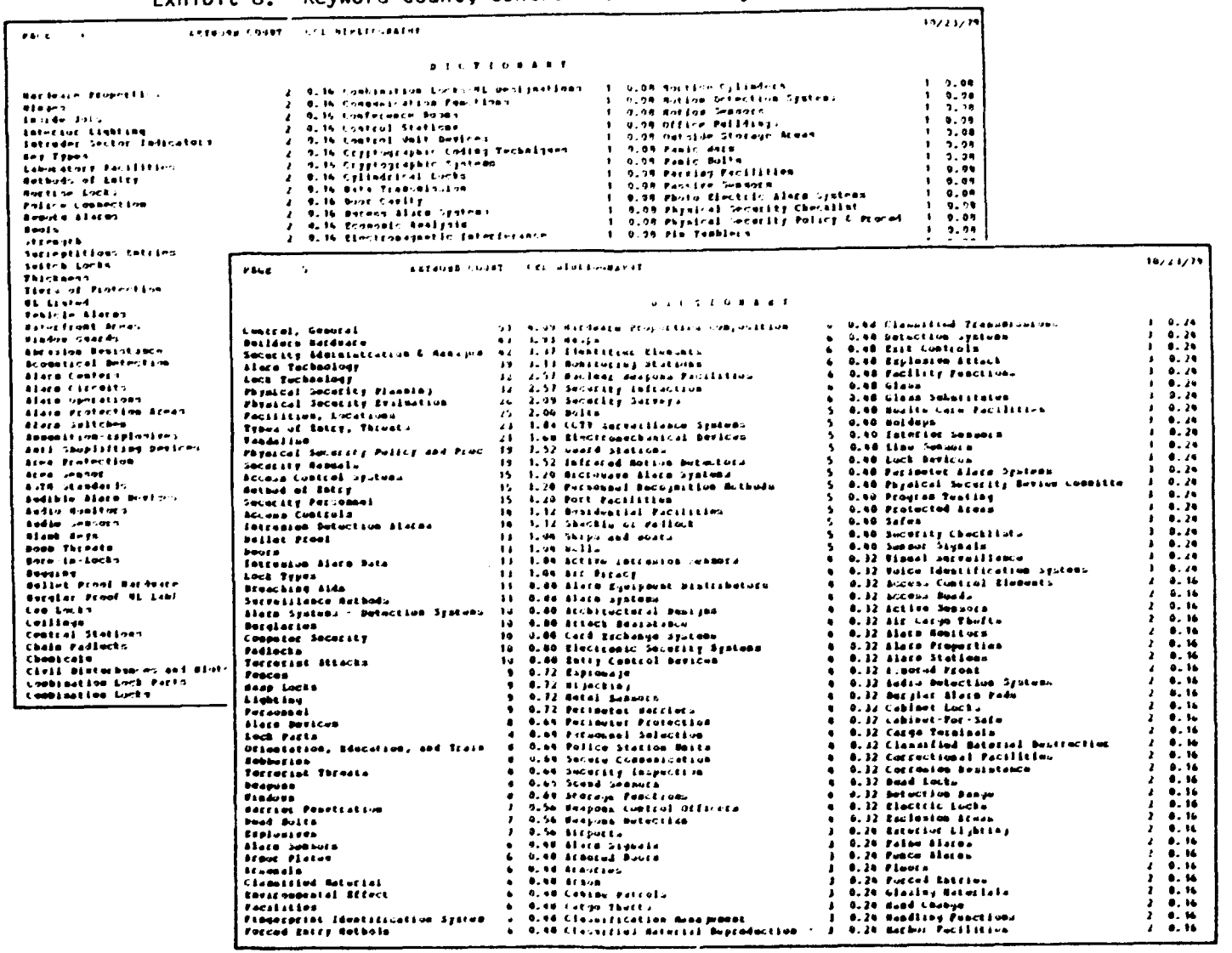
Infrared Active Detectors	5	0.00	Padlocks	10	0.03	Sensor Signals	1	0.26	
Inner Plates	1	0.00	Panic Bars	1	0.00	Sensor States	1	0.00	
Inside Jobs	2	0.16	Panic Bolts	1	0.00	Shackle of Padlock	1	0.00	
Interior Lighting	2	0.16	Parking Facilities	1	0.00	Shipping and Delivery Functions	1	0.00	
Interior Perimeter Protection	1	0.00	Passive Sensors	1	0.00	Ships and Boats	1	0.00	
Interior Sensors	3	0.26	Perimeter Alarm Systems	1	0.26	Ships and Boats	1	0.00	
Intruder Sector Indicators	2	0.16	Perimeter Barriers	4	0.32	Shipyards	1	0.00	
Intrusion	1	0.00	Perimeter Protection	4	0.32	Signature Identification Systems	1	0.00	
Intrusion Alarm Data	13	1.06	Personnel	9	0.72	Silent Alarm Systems	1	0.00	
Intrusion Detection Alarms	14	1.12	Personnel Acceptance Methods	5	0.40	Sliding Doors	1	0.00	
Key Changes	1	0.00	Personnel Selection	4	0.32	Sound Detection Sensors	1	0.00	
Key Changing Combination Locks	1	0.00	Photo Electric Alarm Systems	1	0.00	Speed Sensors	4	0.32	
Key Changing Locks	1	0.00	Physical Security Checklist	1	0.00	Speed Sensors	4	0.32	
Key Control Systems	1	0.00	Physical Security Evaluation	26	2.09	Storage Functions	1	0.00	
Key Technology	1	0.00	Physical Security Planning	32	2.57	Strength	2	0.16	
Key Types						Surreptitious Entries	2	0.16	
Keying System									
Keytypes									
Laboratory Facilities									
Latches									
Lever Tumblers									
Lighting									
Limited Area									
Line Sensors									
Lock Attacks									
Lock Cylinders									
Lock Devices									
Lock Parts									
Lock Technology									
Lock Types									
Locks									
Locksmith Tools									
Locksmiths									
Magnetic Switches									
Manufacturers Association									
Master Keys									
Metal Seamers									
Method of Entry									
Methods of Entry									
Microwave Alarm Systems									
Military Personnel									
Monitoring Stations									
Mortise Cylinders									
Mortise Locks									
Motion Detection Systems									
Motion Sensors									
Nuclear Weapons Facilities									
Office Buildings									
Orientation, Education, and T									
Outside Storage Areas									

PAGE 2 SECOND COUNT - CEL DISCLOSURE 10/23/79

VOCABULARY WORDS

Abrasion Resistance	1	0.00	Padlocks Hardware	99	3.93	Electronic Security	1	0.00	
Access Control Elements	2	0.16	Pellet Proof	13	1.04	Electronic Security Systems	4	0.32	
Access Control Systems	15	1.20	Pellet Proof Hardware	1	0.00	Entry Control Devices	4	0.32	
Access Controls	14	1.12	Perglar Alarm Pads	2	0.16	Environmental Effect	6	0.48	
Access Roads	2	0.16	Perglar Proof UL Lable	1	0.00	Espionage	4	0.32	
Acoustical Detection	1	0.00	Perglaries	19	0.00	Exclusion Areas	2	0.16	
Active Intrusion Sensors	9	0.32	Cabinet Locks	2	0.16	Exit Controls	3	0.24	
Active Sensors	2	0.16	Cabinet-For-Safe	2	0.16	Exit Devices	1	0.00	
Air Cargo Thefts	2	0.16	Can Locks	1	0.00	Exits	1	0.00	
Air Piracy	4	0.32	Casing Patrols	3	0.24	Explosive Attack	3	0.24	
Airports	2	0.24	Card Exchange Systems	4	0.32	Explosives	7	0.56	
Alarm Centers	1	0.00	Cargo Terminals	2	0.16	Exterior Lighting	2	0.16	
Alarm Circuits	1	0.00	Cargo Thefts	3	0.24	Exterior Sensors	1	0.00	
Alarm Devices	8	0.64	CCTV Surveillance Systems	5	0.40	Facilities	6	0.00	
Alarm Equipment Distributors	4	0.32	Ceilings	1	0.00	Facilities, Locations	25	2.00	
Alarm Monitors	2	0.16	Central Stations	1	0.00	Facility Functions	3	0.24	
Alarm Operations	1	0.00	Chain Padlocks	1	0.00	False Alarms	2	0.16	
Alarm Properties	2	0.16	Checklists	1	0.00	Feasibility Studies	1	0.00	
Alarm Protection Areas	1	0.00	Civil Disturbances and Riots	1	0.00	Fence Alarms	2	0.16	
Alarm Sensors	6	0.48	Classification Management	3	0.24	Fences	9	0.72	
Alarm Signals	3	0.24	Classified Material	6	0.00	Filing Cabinet C Locks	1	0.00	
Alarm Stations	2	0.16	Classified Material Destruction	2	0.16	Fingerprint Identification Systems	6	0.00	
Alarm Switches	1	0.00	Classified Material Reproduction	3	0.24	Floors	2	0.16	
Alarm Systems	4	0.32	Classified Transmissions	3	0.24	Forced Entries	2	0.16	
Alarm Systems - Detection Systems	10	0.00	Combination Lock Parts	1	0.00	Forced Entry Methods	6	0.00	
Alarm Technology	39	3.13	Combination Locks	1	0.00	Frames	1	0.00	
Amonitive-Explosives	1	0.00	Combination Locks-UL Designations	1	0.00	Gates	1	0.00	
Anti-Shoplifting Devices	1	0.00	Communication Functions	1	0.00	Glass	3	0.24	
Architectural Designs	4	0.32	Computer Security	10	0.00	Glass Substitutes	3	0.24	
Area Protection	1	0.00	Conference Rooms	1	0.00	Glazing Materials	2	0.16	
Area Sensor	1	0.00	Control Stations	1	0.00	Guard Stations	5	0.00	
Arrow Plates	6	0.00	Control Unit Devices	1	0.00	Guard Windows	1	0.00	
Armored Doors	3	0.24	Control, General	51	0.00	Hand Change	2	0.16	
Armored Front	2	0.16	Correctional Facilities	2	0.16	Handling Functions	2	0.16	
Arrection	3	0.24	Corrosive Resistance	2	0.16	Harbor Facilities	2	0.16	
Arsenals	6	0.48	Cryptographic Coding Techniques	1	0.00	Hardware Properties	2	0.16	
Arson	3	0.24	Cryptographic Systems	1	0.00	Hardware Properties-Composition	6	0.00	
ASTM Standards	1	0.00	Cylindrical Locks	1	0.00	Hasp Locks	9	0.72	
Attack Resistance	4	0.32	Data Transmission	1	0.00	Hasps	6	0.00	
Audible Alarm Devices	1	0.00	Dead Bolts	7	0.56	Health Care Facilities	3	0.24	
Audio Detection Systems	2	0.16	Dead Locks	2	0.16	Heat Detectors	1	0.00	
Audio Emitters	1	0.00	Detection Range	2	0.16	Heat Sensors	1	0.00	
Audio Sensors	1	0.00	Detection Systems	1	0.26	Hijacking	4	0.32	
Barrier Penetration	7	0.56	Door Cavity	1	0.00	Hinges	2	0.16	
Blank Keys	1	0.00	Doors	13	1.04	Holdups	3	0.24	
Bolts	5	0.00	Duress Alarm Systems	1	0.00	Identifying Elements	6	0.00	
Bomb Threats	1	0.00	Economic Analysis	1	0.00	Illicit Chemicals	1	0.00	
Borrow-Locks	1	0.00	Electric Locks	2	0.16	Imaging Devices	1	0.00	
Breaching Aids	11	0.00	Electromagnetic Interference	1	0.00	Imaging Systems	1	0.00	
Bonding	1	0.00	Electromechanical Devices	5	0.00	Impressioning Tools	1	0.00	

Exhibit 8. Keyword count, controlled vocabulary terms listed by frequency.



SECTION 6
SCOPE OF USER INSTRUCTIONS FOR INTERACTIVE BATCH SEARCHES

During FY 1980, one of the planned technical efforts is the development of a file search capability in an interactive batch mode. Interactive batch in this context refers to the capability interactively (1) to construct, submit and manipulate a job (in this case a search of the on-line Master CEL FAMULUS File), which is processed in a batch mode by the Itel AS/6, and then (2) to obtain remotely the search results as a batch output, eventually through using the Data General DASH TP2 printing terminal at the CEL Physical Security Laboratory in Port Hueneme.

Implementation of the FAMULUS Search Program will create this capability for the CEL Physical Security Data Management System (see Figure 2, supra). It will enable much more specific types of searches according to specific keywords, or combinations of keywords, and production of much more specific outputs. This capability will be particularly useful as the number of records in the Data Management System increases.

Once the Search Program has been tested and debugged, a set of user instructions will be written to replace this text.

APPENDIX

FAMULUS USERS' MANUAL

NOTE: This manual has been included in its entirety. It is computer output from the Itel AS/6 and represents the most up-to-date version. It contains its own Table of Contents and has its own pagination.

Volume II

F A M U L U S

U S E R S M A N U A L

University of California
Santa Barbara

September 1977

Fam-ū-lus (fam' ū les), n., pl. -li (-lī). a servant or attendant, esp. of a scholar or a magician. [t. L]

-the American College Dictionary
Random House, New York

Acknowledgement: The substance of this manual comes from the Famulus Users Manual produced by the Computer Center at University College, London. Their manual incorporated much of the Famulus Users Manual published in 1969 by the Pacific Southwest Forest and Range Experiment Station at the University of California Berkeley where the Famulus system originated.

This manual was edited and in part rewritten to describe the University of California Santa Barbara version of Famulus. Bob Freeman and Ryan Werner were the editors.

FORWARD

Famulus is an integrated set of FORTRAN IV programs for information retrieval. Designed with the individual researcher in mind, Famulus allows the user to create, correct, update, sort and merge, index, search, and print large files of information. The programs are simple to use and costs are moderate.

Famulus originated at the Pacific Southwest Forest and Range Experiment Station at U. C. Berkeley. The system was conceived by Theodore B. Yerke, the station Librarian, as a "personal documentation system for research scientists." Mr. Yerke worked with Robert M. Russell in the development of a prototype system. In July 1967 the Research Branch of the Forest Service Service in Washington D.C. agreed to support development of a more versatile system. The IBM 360 conversion from the original CDC 6400 programs was done by Jerry Pine at the University of California, Los Angeles CCN computer center.

Mr. Alan Shaw and others at University College, London (UCL), added extensive new features to Famulus which constitute about one-fourth of the system presented in this manual. In 1973 they generously supplied the source code and documentation for Famulus to the Sociology Computing Facility.

Several enhancements and modifications to Famulus have been made at U. C. Santa Barabara by John Fuhring of the Computer Center, and others. During 1977, Bob Freeman and Tom Anderson created a brief Programmers Manual that describes the Famulus file structure and gives the function of each program and subprogram. They also added many comments to the EDIT program.

CONTENTS

GENERAL DESCRIPTION

Famulus is an information storage and retrieval system specifically designed for research workers. Traditional systems such as shoe boxes stuffed with filing slips can be converted to the Famulus system and the benefits obtained will repay the effort involved. Famulus offers various information retrieval facilities such as automatic sorting of files into alphabetical order, indexing, and searching in response to specific requests.

The system is sufficiently general in design to encourage diverse applications. One of the most obvious is the maintenance of private bibliographies or abstract files. In a small library environment Famulus could be used for many purposes, from keeping the main catalogue to maintaining a 'wants' list of books to be obtained. A linguist might use the system to maintain a dictionary or grammar file.

Famulus handles almost any kind of texts except large files with little or no regular internal structure. It is structure, not content, that matters. This manual is an example of a file which is not suitable for Famulus.

Although primarily designed for bibliographic applications, Famulus can be used in any situation where "index cards" would be useful. Each "citation", or record in Famulus is like a 3 by 5 index card. Within each citation up to 10 fields (analogous to lines on the index card) are available. For example, Famulus has been used to keep track of a large record collection, a data base of participants in community training programs, and a file of abstracts on laws about the California coastal area.

FILE ORGANIZATION

A record or citation is the basic unit of information in Famulus. A file consists of an unlimited number of records. The first step in designing a Famulus file is to decide what logical entity in the data a record should represent. For instance, in a bibliographic file it is natural to consider one citation or reference to be a record. In complex applications it may not always be obvious, but it is very important to establish clearly from the outset what constitutes a record.

The record itself is broken down into fields. Each field is given a name or label (up to four characters long), appropriate to its content. Up to ten fields are permitted. The amount of information in a field may vary from record to record or from field to field, subject only to the restriction that a record may not exceed 4000 characters in length. Every record in a file must have the same field structure.

A field is the unit of information used to sort the file into alphabetical order. Therefore the field divisions constitute one of the principal methods of access to records in the file. Consequently the number of fields and the division of the information in the record into fields is dependent upon the avenues of access which are required to the records. See the SORT program description for further discussion of this point.

One field may be designated as a "descriptor field." In ordinary fields words are identified as such by being separated by blanks and punctuation. In the descriptor field whole phrases may be treated as units by the use of a specified delimiting character. This facility caters to index terms consisting of more than one word.

Example: Here are two citations from a bibliography.
(The choice of field labels is completely arbitrary)

```
AUTH  Jeffries, Ronald
TITL  A User's Guide to QUIELE
PUBL  Bubbs Press
YEAR  1984
NOTE  A fine example of the early computer era.
      Good as a reference; entertaining bedside reading.

AUTH  Friedman, Daniel P.
TITL  The Little Lisper
PUBL  SRA Associates
YEAR  1974
```

BASIC OPERATIONS

The Famulus programs are summarized below, in an order which reflects our notion of their relative importance.

EDIT: Creates an original Famulus file from Wylbur or card input, and modifies existing files.

GALLEY: Produces a printed copy of a Famulus file. It has four output formats: the default format which does not print field labels and does not start new line for each field; the /PRINT BY FIELDS/ format which labels each field and starts each on a new line; the /PRINT BY SUBJECTS/ format which does not print field labels, and produces left and right justified margins; and the /TABS/ option which prints the fields as columns between user selected tabs. /TABS/ is most useful with very short fields. A GALLEY run can specify selected records and fields to be printed, thus a file with ten fields per record may be listed with only three fields appearing. The order of the fields may also be altered in the output.

SORT: Alphabetically sorts the records in an existing Famulus file on any given field and puts the sorted results in an output file. file is not destroyed.

SEARCH: Provides for computer searching of a Famulus file. Output can be a printed listing of all file entries which meet the selection criteria, or a listing of only the record numbers of those entries. With appropriate Job Control Language (JCL) and use of the /WRITE TAPE/ control statement, SEARCH will produce an output file.

OSSIFY: For various reasons one may need to convert a Famulus file back to statement form. Ossify does this with any internal Famulus file as input and a statement image file as output. With appropriate JCL puched statement output may be obtained.

MERGE: Takes two sorted Famulus files and outputs a merged copy. The two files to be merged must have the same number of fields per record, though the fields can have different names. Each file must be sorted on its first field.

MULTIPLY: In some cases the records a file may be sorted on a field which has multiple entries. A printout of the file would not readily demonstrate which records contained a particular field entry, as a given record would only appear once, under the first item listed in the field on which the file was sorted. To allow for this, MULTIPLY produces an output file with multiple record entries generated, one for each item in the specified field. If we wished to have a listing of our file by keyword, and a given record had three keywords, we could have MULTIPLY produce duplicate entries of the record, one for each of the three terms in the specfied field. If this file was printed out we would find the given record in three different places.

INDEX: Produces an alphabetized index of a Famulus file. The index can reference one or more fields of the record. One typical use might be to index a descriptor or keyword field.

COUNT: For any specified field or fields within a Famulus file COUNT produces a vocabulary listing with frequency of occurence noted for each word. It is a useful step in the development of a controlled vocabulary keyword thesaurus.

VOCAB: Basically does the same thing as COUNT, but does not give frequencies. In almost every case, COUNT would be preferable to VOCAB. The exception might be an extremely large file, or a file with words longer than the maximum allowed by COUNT.

KEY: KEY allows 'automatic' keywording. It scans a specified input field and for each non-trivial word or term it inserts the same into a specified keyword field. One problem is that often the most useful key words are 'added keywords', that is, keywords which specify the subject of the entry but do not necessarily occur in the title. KEY does allow for synonyms whereby a number of input terms can be considered equivalent.

KWIC: Produces a keyword-in-context index.

FAMULUS AND WYLBUR

Famulus files may be created on Wylbur and submitted to the central computer for Famulus operations with far greater ease than cards allow. Storage of Famulus data in Wylbur files allows quick reference to, and modifications of, the card (or Wylbur) image data.

It is important, however, to distinguish between data in external form (card or Wylbur image) and its representation on disk or tape as a Famulus file. The distinction is not in the storage medium, for no such medium is any less external than another; however from the point of view of the Famulus system, internal files are those in the form in which data is stored and processed. EDIT is the only Famulus program which accepts card image data. The other programs only operate upon the files created by EDIT.

Just as data in external form is not readable by the Famulus system, internal Famulus files are not readable by other programs, and are not suitable for direct transfer out of the system. That is to say, Famulus cannot operate on a Wylbur file except to convert it into internal format via the EDIT program. Likewise, internal Famulus files are meaningless to Wylbur. The OSSIFY program converts files from the internal Famulus format to a form that can be edited on Wylbur.

PREPARING DATA FOR FAMULUS

Existing machine-readable data files can sometimes be converted by a special purpose program to Famulus input format. Otherwise data must be punched on cards, or keyed at a terminal.

Input Format

Field labels are written in columns 1-4 of the first line in a field. Continuation statements for the field do not carry labels. Actual text of the record begins in column 6 and can continue through column 80. If it is necessary to continue onto another statement, end the first statement after a word or sentence in any column and simply start in column 6 of the second statement. Famulus will append the continuation line to the first, inserting no blanks after hyphens, one blank after letters, and two blanks after periods, commas, exclamation points, question marks, semicolons, and colons.

The fields in a record must be in the correct order, otherwise the record will be rejected. Fields may be omitted, however, since not every record in a file will require all the allowable fields. In this case a statement containing the field label is not required.

Each record is followed by a blank line which separates it from the next record. If the blank line is left out, the second record will be run on to the first and both will be rejected. The last record in the input deck should also be followed by a blank line.

Preparation of upper and lower case text at a Wylbur terminal should present no problems. For alternate methods of introducing lower case text (such as on cards) see Appendix C.

Below are examples of the exact format for inputing bibliographic citations for Famulus. Note that a blank line is inserted between each citation or record.

```
columns:
12345678911234567892123456789312345678941234567895123456789612345678
▼       ▼        ▼         ▼         ▼         ▼         ▼
AUTH BERKELEY, EDMOND C.
TITL THE COMPUTER REVOLUTION
PUBL GARDEN CITY, NEW YORK: DOUBLEDAY AND CO.,INC., 1962
YEAR 1962
KEYW BOOK CITATION
CALL Z 699 B4
ABST EXAMPLE CITATION FOR A BOOK.

AUTH ANONYMOUS
TITL "A CITY WHERE COMPUTERS WILL KNOW ABOUT EVERYBODY"
PUBL U.S. NEWS AND WORLD REPORT, MAY 15,1967 PG. 78-79
YEAR 1967
KEYW NEWSPAPER CITATION, MAGAZINE CITATION, ANONYMOUS, NO AUTHOR
CALL Z 1. G54
ABST EXAMPLE OF CITATION FOR NEWSPAPER OF MASS CIRCULATION MAGAZINE.
     ALSO ILLUSTRATES THE USE OF A CONTINUATION.

AUTH SOMEBODY, FRED. B., AND JENIFFER CHUMASH
TITL "THE ARTICLE TITLE IS IN QUOTES"
IN   RON LASTNAME (ED), THE TITLE OF THE BOOK
PUBL BADROCK, N.J.: EXAMPLE PUBLISHING, INC., 1984
YEAR 1984
KEYW ARTICLE IN COLLECTION CITATION, USE OF 'IN' FIELD
CALL Z2 99 A101
ABST EXAMPLE OF CITATION OF AN ARTICLE IN A BOOK THAT IS A COLLECTION
     OF ARTICLES OR INDIVIDUALLY AUTHORED CHAPTERS.
```

PROGRAM CONTROL STATEMENTS

The operation of Famulus programs is controlled by program control statements. They are used for various purposes; e.g. to inform Famulus of the names of files or fields, to select portions of a file for processing, to request particular printed output formats, and many other varied functions. Some control statements are specific to certain programs, but many are used by more than one program. An effort was made at UCL to generalize the control statements as far as possible, to achieve greater flexibility and more powerful facilities, hopefully without changing the philosophy of the original system too much. A chart of the control statements available to each program is given in Appendix A.

All control statements are a set of upper case keywords recognized by Famulus, enclosed in slashes and written beginning in column one onwards. Some control statements consist of nothing more than this:

```
/ORIGINAL/
/WRITE TAPE/
/PUNCH/
/NUMBERS/
/PRINT BY FIELDS/
/PRINT BY SUBJECTS/
/FLAGS/
```

The information conveyed by these statements is essentially of a yes/no nature. The majority of control statements, however, require provide particulars of the action desired, in the form of text which follows the second slash of the statement, though not necessarily immediately. If the whole text does not fit on one line it can be continued on the next anywhere from column one onwards. The text of most statements is enclosed in parentheses: Refer to Appendix A for a summary of control statement syntax.

```
/FIELDS/(AUTH,TITL,PUB,DATE)
/DELETE/(3, 15-19, 46-68,101)
/SELECT/(1-500, 575-690)
```

There are no enclosing parentheses, however, on the following:

```
/ID/PARTS INVENTORY
/NEW ID/ CLASSIFIED INDEX
/SEARCH/ SOIL STABILITY & (EROSION | SLIDES)
/VOCABULARY/A*THE*IN*SOIL,STABILITY,EROSION
/SYNONYMS/ EROSION=SLIDES,DUST
```

The use of the control statements is described further under each separate program, but it is appropriate at this point to introduce a few statements which are common to most of the Famulus programs.

/ID/

Internal files are always labelled with an identifier. When a file is used as input to a program Famulus checks the identifier written on the tape with the text of the /ID/ statement. If they fail to match an error message is produced and the program terminates.

The identifier may be up to 100 characters in length. Blanks before and after the file name are ignored. Write up to column 80, and if required continue in column one.

Every Famulus job needs an /ID/ statement, and it must be the first control statement to appear.

/NEW ID/

Whenever a operation on an existing file produces a new file the identifier with which the new file is labelled is taken from a /NEW ID/ control statement. The new identifier is punched after /NEW ID/ in the same way as on the /ID/ statement. If this control statement is not supplied the /ID/ statement is used instead, which means that the output file is labelled the same as the input file by default.

In most programs the text from the /NEW ID/ statement is printed as a title on the first line of every page after the page number. Even when no output file is being made this control statement is still useful for entitling the printed output. Again, the default title is taken from the /ID/ statement.

/FIELDS/

Field labels may be up to four characters in length, must begin with an alphabetic character, and the remaining characters must be either alphabetic or numeric. Lower case characters and special characters such as punctuation are not allowed.

```
PUBI (legal field label)
PUB. (illegal field label)
```

The text of this statement consists of a list of field labels separated by commas, the whole enclosed in parentheses. The list supplies three kinds of information: the number of fields, the order in which they occur in the record and their names. This information is used in different ways according to

the requirements of each program. For instance, in EDIT the /FIELDS/ statement is used to define the full record structure for the output file, in GALLEY it is used to define the number and order of the fields to be printed; in SORT it defines the sort key, in SEARCH and COUNT it indicates the field or fields to be searched or counted; and in MULTIPLY, where only one field label is permitted in the statement, this information defines the field on which the file is to be multiplied.

/DESCRIPTOR FIELD/

The INDEX program is designed to work only on the descriptor field of a file. Descriptors are subject headings or index terms which often consist of more than one word. Therefore within the descriptor field descriptors are separated by a delimiter or break character and may consist of any character string including blanks and punctuation apart from the break character.

Other programs, such as SEARCH, COUNT, MULTIPLY, and KEY, also recognize the descriptor field and regard its contents differently from other fields. When working on the descriptor field these programs, like INDEX, identify items by means of the break character, and words, delimited by blanks or punctuation, are the basic items in other fields.

Only one field may be a descriptor field at any one time. There is no obligation to designate a descriptor field, but once defined the identity of the descriptor field becomes part of the information carried in the file like the identifier or fields information, and there is no need to include the /DESCRIPTOR FIELD/ statement again. This information cannot be altered on an input tape, but a /DESCRIPTOR FIELD/ statement will temporarily redefine the descriptor field during the execution of many of the Famulus programs, reverting afterwards to the field defined on the file. If an output file is produced, the descriptor field may be permanently redefined on the output tape by the /DESCRIPTOR FIELD/ statement, otherwise the input file descriptor field is carried over by default.

The delimiter or break character is taken as comma by default, and this information is not carried on the file. If the break character used is not a comma, therefore, the /DESCRIPTOR FIELD/ statement will be necessary every time.

The text after the /DESCRIPTOR FIELD/ statement consists of a field name in parentheses followed by a break character, also in parentheses. The break character is not optional, even if it is comma; its omission causes some programs to malfunction. The field name must be one of those defined on the input file, or on the /FIELDS/ statement if, as may be the case with EDIT, there is no input file. Any character may serve as the break character.

/SELECT/

This control statement is used to select records for processing out of the input file. The text consists of a list of record numbers not necessarily in ascending order separated by commas, the whole list being enclosed in parentheses. Instead of a number an item in the list may consist of a range of consecutive numbers, indicated by separating the first and the last in the range by a dash. Text length for this statement is limited to 100 numbers, where a sequence counts as two numbers, irrespective of its length.

This statement is always optional. If it is omitted, the whole file will be processed unless it exceeds 100,000 records. For processing to continue beyond this limit an appropriate /SELECT/ statement is required.

EDIT

Creating an original file

EDIT creates an internal Famulus file from card or Wylbur input and writes the file into magnetic tape or disc storage. In this case the /ID/,/FIELDS/ and /DESCRIPTOR FIELD/ control statements provide the name of the file, the list of field labels, and the name of the descriptor field, if any, and this information is written in the output file (FT02F001) preceding record entries. An /ORIGINAL/ control statement must be present to indicate that an original file is being created and that there is no input file. The last control statement must be /CITATIONS/, followed by the data for EDIT.

The card image input can immediately follow the /CITATIONS/ card or it can be stored as a separate file. If the EDIT program finds no data following the /CITATIONS/ control statement, it opens FT03F001 and tries to read citations there. Note that the file on FT03F001 must have the following characteristics: RECFM=FB and LRECL=80. If this file was saved from Wylbur, the command "CARD" or "LRECL=80" will produce the proper file characteristics. (If one of these was not used, you will get strange error messages!)

Updates

Once the file has been created fresh data may be added by omitting the /ORIGINAL/ control statement and supplying the file as input, using the ddname. FT01F001, and DISP=OLD (indicating that the file already exists). The file is copied to an output file (FT02F001), and the new data is added to the end of the original data. Corrections to the input file may be made via /REPLACE/ and /DELETE/ control statements as it is being copied.

Adding new data to a large sorted operational file may call for a more complicated procedure. The new data can be written onto a temporary file and then sorted into the same order before being merged with the master file. This is more efficient than adding new records to the master and sorting the whole file after every update.

Changing the file identifier and field labels

If no additions are to be made the /CITATIONS/ control statement is omitted, and operations are limited to changes to

the INPUT file. /NEW ID/ renames the output file. New field names may follow a /FIELDS/ statement in order to produce new field labels in the output file.

Only EDIT can change field names in this way; all the other programs require the labels on the /FIELDS/ statement to match the input tape. Note that EDIT cannot be used like SORT to change the order of the fields in the record. Nor can the number of fields be changed. It is wise, therefore, when creating the file, to declare more fields than are immediately required using dummy names which can be changed later when the need for another field arises. For example, a spare field may be needed as a key field for the KEY program. Dummy fields incur virtually no time or space penalty and can be ignored during data preparation.

Deleting records

Complete records are deleted from the file by the /DELETE/ control statement, similar in syntax but opposite in semantics to /SELECT/. A list of up to 500 record numbers is acceptable to /DELETE/. If two numbers in the list are separated by a hyphen instead of a comma they represent a range of records beginning with the first and ending with the second.

Corrections

Corrections are made by means of the /REPLACE/ statement. Up to 100 corrections are permitted in each run of EDIT. /REPLACE/ occurs only once, and is followed by the details of each replacement in free format. Every change requires four pieces of information: the record number, in parentheses, the name of the field which is to be changed, also in parentheses, the text which is to be replaced, and the new material which is to take its place. Three asterisks are used to delimit the beginning of the first text, the end of the first and beginning of the second text, and the end of the second, respectively.

```
/REPLACE/(1) (AUTH)*SMITHH*SMITH*
(2) (TITL)*MATHIMATICAL*MATHEMATICAL*
(5) (ABST)**THIS PAPER INCLUDES A DISCUSSION OF
CURRENTLY IMPLEMENTED LINEAR PROGRAMMING TECHN
IQUES AVAILABLE FOR THE IBM 360.*
(120-127) (AUTH)*MACPHEE,*MAC PHEE,*
```

These lines change "SMITHH" to "SMITH" in the author field of record 1, "MATHIMATICAL" to "MATHEMATICAL" in the title field of record 2, add an abstract to record 5, and change author's name from "MACPHEE" to "MAC PHEE" in eight consecutive records.

When numerous corrections are to be made the one-statement-per- correction approach is most convenient. If the text extends beyond column 80 it is continued in column one of another statement. The corrections may also be punched as a string, in free format.

```
/REPLACE/(1)(AUTH)*INCORRECT INFORMATION*CORRE
CT INFORMATION*(2)(TITL)**INFORMATION TO BE AD
DED*(5)(AUTH)*MATERIAL TO BE DELETED**(9)(ABS)
**NEW MATERIAL TO BE ADDED*(25)(AUTH)*INCORREC
T*CORRECT*(25)(TITL)*INCORRECT*CORRECT*
```

Corrections should always be made to the latest version of a file, and the corresponding most up-to-date listing should be used to look up the numbers of the records to be changed. Corrections need not be input in ascending order of record numbers. The program makes one pass through the input file, taking each record in turn and scanning all corrections to find any that apply to it. The cited field is then scanned for the text between the first and second asterisk, and this is replaced by the text between the second and third asterisk. The length of the two texts need not be the same.

Deletions and additions to a field

Deletions can be made by putting the string to be deleted between asterisks and punching the third asterisk immediately after the second, which means that the replacement text is a null or empty string. Material can be added to the end of a field by punching two asterisks before and the third after it, which means that a null string is deleted.

Sufficient information must be quoted to uniquely identify the text to be replaced. If a word occurs more than once in a field and you wish to change only one occurrence of it, include enough preceding or following characters to distinguish the two occurrences.

If there are two changes to be made within the same field with considerable information separating them, make two replacements quoting the record number and field label each time.

Lower-case flag characters

To facilitate corrections to files of upper and lower case text, use either Wylbur to prepare the replacement data or the flag characters described in Appendix C. If flags are used, the /FLAGS/ statement must precede the /REPLACE/.

Printed output

The /PRINT/ statement is used to control the printing of the file. The text of this statement is similar to /SELECT/: a list of up to 100 numbers identifying records or sequences of records to be printed. The record numbers correspond to the output file. If no /PRINT/ statement is supplied the default actions are as follows: records from an input file are not printed unless changes are made in them and on data input, and with a /CITATIONS/ statement, only the first 1000 records are printed automatically. Printing can be suppressed altogether by /PRINT/(0).

Records are printed with explicit field labels as in GALLEY when the /PRINT BY FIELDS/ statement is used. This is the most convenient format for making corrections, and no other format is permitted.

The maximum number of characters printed on a line is 128, which is also the default. The /WIDTH/ statement reduces the line width to a number specified in parentheses after the /WIDTH/.

/WIDTH/(70)

This statement reduces the line width to 70 characters. The minimum width is 20 characters. Famulus never ends a line in the middle of a word, unless the word is too long to fit on a line. Lines are left with spaces at the righthand side if not completely filled.

Limitations on EDIT, and LEDIT

EDIT allows a maximum of 100 corrections per run, and a maximum of 800 characters per correction. If either limit must be exceeded, use EDIT's big brother, LEDIT, which allows as many as 1000 corrections of up to 4000 characters per run.

Sample control statements for EDIT

```
/ID/DRACUNCULUS BIBLICGRAPHY
/FIELDS/(AUTH,TITL,JRNL,PAGN,YEAR,LANG,SRCE,KEYW,ELNK,ABST)
/DESCRIPTOR FIELD/(KEYW)(,)
/ORIGINAL/
/CITATICNS/
/WIDTH/(70)
/REPLACE/(1)(AUTH)*SMITHH*SMITH*
(2)(TITL)*MATHIMATICAL*MATHEMATICAL*
/DELETE/(7,100,50-63)
/PRINT/(7,100,50-63)
```

OSSIFY

OSSIFY creates a file of card images from any Famulus file. The new file will be in standard Famulus input format, with the field labels established by the most recent EDIT run. The principal use is to produce "backup" files in case the Famulus file on disk or tape is damaged or completely lost, or to make changes on Wylbur.

Under certain conditions, it may be less expensive to use OSSIFY for the correction of a badly organized file, particularly if the file has long fields, such as abstracts or text-storage which must be deleted or changed extensively. For instance, if for some reason many citations had incorrect abstracts, or if the abstracts were written with the wrong citation, or if several fields in each citation had errors, it would be far more economical to have the faulty records put into statement image form on disk. Then, after making the corrections on this file with Wylbur and deleting the original citations from disk or tape, an additions run would re-add the corrected citations to the disk or tape

The /SELECT/ statement indicates the records to be written onto disk. The record numbers should directly follow the /SELECT/ enclosed in parentheses. If this statement is not present, the entire file will be punched.

A /FIELDS/ statement indicates which fields OSSIFY should use. The fields labels are enclosed in parentheses and immediately follow the "/FIELDS/" statement.

If the "ossified" file is intended for editing on Wylbur, use the /WIDTH/ statement so that the line length will allow some "editing room" on each line. The minimum width is 20. The ossified file is routed to FT07F001.

Sample control statements for OSSIFY

```
/ID/INPUT FILE IDENTIFIED
/SELECT/(7,100,50-63)
/WIDTH/(50)
/FIELDS/(AUTH,TITL,YEAR)
```

SORT

This program rearranges the records in a file into alphabetical order, using any field or combination of fields as the sort key. The sort key is the portion of the record which is used for alphabetical comparisons.

It is not possible to define a part of a field as the sort key. This limitation should be considered when designing the structure of the record. For example, in the case of a bibliographic file, if both author and title catalogues are to be produced by means of SORT and GALLEY jobs, author and title information should not be incorporated in a single field. Conversely, if the date will never be required as a sort key it could be included, if desired, in one of the other fields. See MULTIPLY for an escape from this limitation.

Sort key comparisons

The order of two records is decided by comparing their sort keys character by character from left to right. As soon as a mismatch between a pair of characters is found the records are ordered on the basis of an internal collating sequence.

The collating sequence

It should be explained that characters are represented within computers by numeric codes which differ from machine to machine. The IBM 360 uses EBCDIC, a code in which characters are represented by numbers in the range 0 to 255. By arranging the codes in ascending order a machine dependent collating sequence is obtained, which could be used for sorting. Famulus, however, converts to its own internal collating sequence so that the same sort order can be obtained irrespective of the machine on which the program is run.

Blank precedes other characters. Care must be taken in certain cases to pad the data with blanks or noughts to ensure correct allignment of the keys. For instance, 15 will come before 5, but after 05. Famulus removes leading blanks, so another character must be used for padding at the beginning of a field.

SORT requires an input data set (DDNAME FT01F001) in Famulus internal form on tape or disc, as produced by the EDIT program. It creates a new sorted file (FT02F001), and the input file remains unchanged. The sorted file is not printed. Only a

listing of the program control statements and technical information such as the number of records processed is given, plus an indication that processing was successfully completed. GALLEY may be used to print the new file.

Program control statements

The /ID/ control statement contains an identifier which must match that of the input file. This control statement is obligatory, and must precede the rest, which are optional.

The /FIELDS/ statement defines the sort key. Any or all of the field labels in the input file may be given, in any order. When records are compared, if the first field is identical the second or subsequent fields are used to determine precedence.

On the output file of sorted records the fields are ordered as specified in the /FIELDS/ statement, and any fields not specified remain in the order already established in the input file. If this statement is absent, the implicit order of fields in the input file is assumed. If GALLEY is used to print the sorted file the fields will be printed in the new order established by SORT, unless another /FIELDS/ statement is used for GALLEY.

The /SELECT/ statement may be used to break large files into sections for more efficient sorting. It is recommended to sort up to 3000 records at a time and then merge the sorted sections. If this statement is absent the whole file is sorted.

A /NEW ID/ statement may optionally be used to specify a new identifier for the output tape.

Sample control statements for SORT

```
/ID/DRACUNCULUS BIBLIOGRAPHY
/FIELDS/(AUTH,YEAR)
/SELECT/(1-2500)
/NEW ID/FIRST HALF
```

MERGE

This program provides the updating facility for Famulus-controlled files. It merges any "master file" with an "additions file". MERGE can be used for two purposes - to update files by merging information from two files onto one output file, or to join files belonging to two or more persons. For instance, the various members of a working group may maintain separate literature files, but on occasion they may wish to make a master listing of all these files.

MERGE will only accept input files having the same number of fields; however, the field names do not have to be the same. The master file (with the DDNAME FT01F001) and the additions file (FT03F001) will be merged and written onto the output file (FT02F001). The field labels on the output or updated file will be the same as those occurring on the master file. The /ID/ will also be taken from the master file, unless a /NEW ID/ statement is included.

Any record which is not in correct alphabetical order will cause the MERGE program to halt processing, reject the remainder of the job, and print an error message. Therefore, only files which have been ordered in the same way by the SORT program should be input. Unless specifically requested, MERGE does not print out the file. It prints the /ID/ of the master file, the /ID/ of the additions file , and the /ID/ of the output file along with the field labels for each. This will be followed by the number of records on the newly updated file and the familiar three large CK's.

Program control statements

An /ID/ statement for the master tape (FT01F001) and an /ID/ statement for the additions tape (FT03F001), in that order, are mandatory.

A /NEW ID/ should be included if a different /ID/ from the master file is desired for the output.

The output file is not normally printed in full. If no /PRINT/ statement is included ten records will be printed. Otherwise the records specified will be printed. A /PRINT/(0) statement will suppress printing of records altogether.

A line width of 128 characters is normally used, but this may be altered to any value in the range 20 to 128 by the use of a /WIDTH/ statement.

Note that in the original system /PRINT/ in MERGE served the same purpose as /WIDTH/ in the other programs such as EDIT. (see the Famulus Users Manual, 1969). For the sake of consistency, compatible /PRINT/ and /WIDTH/ statements as described above are now implemented in MERGE.

Sample control statements for MERGE

```
/ID/FIRST HALF
/ID/SECOND HALF
/NEW ID/DRACUNCULUS BIBLIOGRAPHY - AUTHOR CATALOGUE
/PRINT/(11-21)
/WIDTH/(65)
```

MULTIPLY

This program is designed to handle problems arising from multiple entries in a field - multiple authorship is a typical example. When two or more authors' names appear in the author field a listing of the file sorted by author will not be a complete author catalogue unless the file is first multiplied to produce a complete new record for each entry in the author field. This is the function of MULTIPLY.

The input file identifier must agree with the name on the obligatory /ID/ control statement. The output file identifier will be the same unless specified otherwise on a /NEW ID/ control statement.

The multiplication field

The input file may be multiplied on one field only, but any field may be used. A record is generated in the output file for each entry in the multiplication field, which is specified either by a /FIELDS/ statement containing only one field label or by a /DESCRIPTOR FIELD/ statement, depending upon whether entries are to consist of separate words or of character strings bounded by a delimiting character. Any character may be defined as the delimiter, the default being comma. A /DESCRIPTOR FIELD/ statement will override any previously defined descriptor field. If neither a /FIELDS/ nor a /DESCRIPTOR FIELD/ statement is supplied the previously defined descriptor field becomes the multiplication field, and if none exists the program terminates with an error message. All the fields in the output record remain the same as in the input record except the multiplication field, which contains only one of the words or phrases in the original. If the multiplication field in any record is empty no output record is created; this is equivalent to multiplication by zero.

Printed output

Apart from the usual control statement listing etc., the printed output from MULTIPLY is limited to the first ten records of the output file. This should normally be sufficient to check the operation of the program. To obtain more (or less) output the required number of records should be specified by means of a /PRINT/ control statement.

Records are printed in the fields format, with the record number on the left and on the right the number of the input record from which it was derived. The number of characters

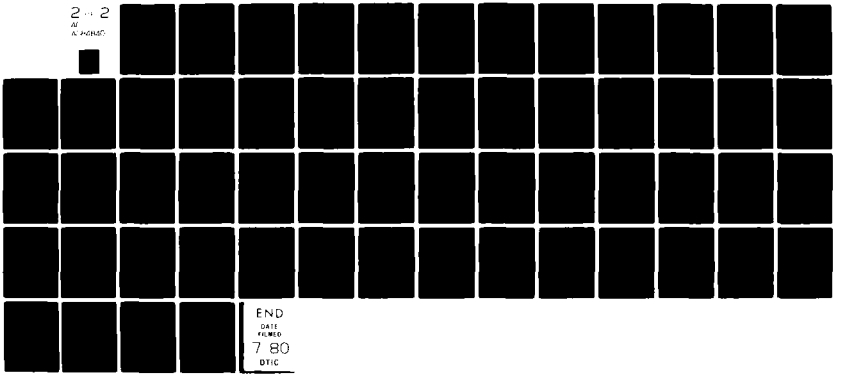
printed per line can be reduced from the normal 128 by means of the /WIDTH/ statement. The minimum is 20.

Sample control statements for MULTIPLY

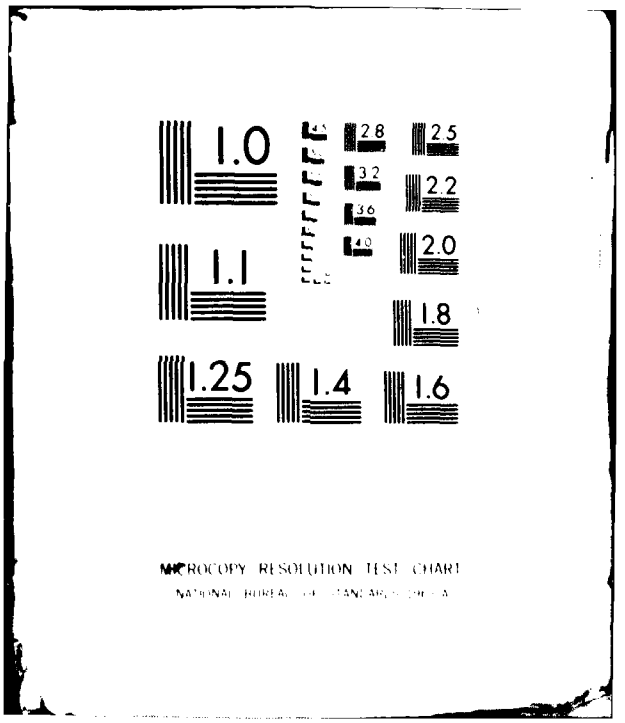
```
/ID/DRACUNCULUS BIBLIOGRAPHY
/DESCRIPTOR FIELD/(AUTH)(,)
/PRINT/(75)
/WIDTH/(80)
```

AD-A084 040 MISSION RESEARCH CORP SANTA BARBARA CA F/G 9/2
DEVELOPMENT OF A PHYSICAL SECURITY DATA MANAGEMENT SYSTEM. VOLU--ETC(U)
NOV 79 J CALDWELL, P BENNER, D SOLOMONSON DNA001-79-C-0182
UNCLASSIFIED MRC-R-531 CEL -CR-80.013 NL

2 OF 2
AD
A084040



END
DATE FILMED
7 80
DTIC


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART

GALLEY

GALLEY will print a Famulus file with a choice of four formats.

File identification

The file to be printed must be identified by an /ID/ control statement with the correct file identifier. This is the only obligatory control statement, and it must precede any others.

Printing portions of a file

Selected portions of a file may be printed by specifying the required records on a /SELECT/ statement. This contains a list of record numbers separated by commas. Ranges of records are denoted by a dash instead of a comma between two numbers. The whole list is enclosed in parentheses.

Note that the record numbers need not be in order, but the records will be printed in file order, not the order on the /SELECT/ statement.

Printed output formats

The standard default format prints the fields in sequence without starting a new line for each field, and also drops the field labels, simply leaving three spaces between fields.

```
1.  THIS IS THE FIRST FIELD.   THIS IS THE SECOND.
```

The /PRINT BY FIELDS/ statement produces an output with field labels, each field beginning on a new line, like the output from EDIT.

```
1  FLD1  THIS IS THE FIRST FIELD.
   FLD2  THIS IS THE SECOND.
```

The /PRINT BY SUBJECTS/ statement will print a file without field labels but with subject headings. The first field named in the /FIELDS/ statement is printed as a heading above the remainder of the record. The first field of subsequent records is only printed if it differs from the previous record. The length of the first field should not exceed the printed-page width, otherwise it will be truncated.

```
THIS IS THE FIRST FIELD.

    THIS IS THE SECOND.
```

The /TABS/ statement prints the fields in tabular fashion according to the tabs set in the text of the /TABS/ statement. The columns are indicated by a list of numbers separated by commas and enclosed in parentheses. For the statement /TABS/(5,20) :

```
THIS IS THE F  THIS IS THE SECOND.
IRST FIELD.
```

This option is obviously suited to long lists of small fields (e.g. part numbers)

/PRINT BY FIELDS/, /PRINT BY SUBJECTS/ and /TABS/ are mutually exclusive options. If neither statement is present the standard print format is produced by default.

Omitting fields

The /FIELDS/ statement in GALLEY is used to define which fields of the record are to be printed, giving the user the option of omitting fields. The fields will be printed in the order in which they appear on the /FIELDS/ statement, regardless of their order in the input file. If no /FIELDS/ statement is supplied all the fields of the record are printed in the order implicit in the file.

Page heading

The /NEW ID/ statement is available in GALLEY, but since no output file is produced by this program it is only used to supply a heading which will be printed at the top of each page of output. If this statement is omitted the input file identifier is printed as a page heading.

Page width, depth and spacing

The required page width may be obtained by means of a /WIDTH/ statement. It may range from 20 characters up to the normal 128. As a guide, ten characters occupy an inch on many lineprinters.

The number of lines per page can be set using the /DEPTH/ statement in a similar manner to the /WIDTH/ statement. The minimum is 13 and there is no maximum.

Spaces can be inserted between lines of print using the /SPACE/ statement in a similar manner to the /WIDTH/ statement.

Omitting Record Numbers

The /PRINT NO NUMBERS/ statement suppresses the record numbers from the printed output.

Sample control statements for GALLEY

```
/ID/FIELD REPORTS
/FIELDS/(NAME,NUMB,OCC,AD,DATA)
/SELECT/(1-5,15-20,25,30,11,8,23,21)
/WIDTH/(100)
/PRINT BY FIELDS/
/NEW ID/ SELECTED REPORTS.
/DEPTH/(30)
/SPACE/(2)
/PRINT NO NUMBERS/
```

INDEX

The index which this program provides is an alphabetical list of terms in the descriptor field of a file. Each term is accompanied by a list of references to the records where it occurs, separated by commas. A record is referenced by its position in the input file, which is printed as an integer to the left of the record in the GALLEY listing of the file. The index is normally used, therefore, in conjunction with a complete listing for indirect access to records via an attribute other than the one by which the file is ordered, such as subject categories.

The descriptor field

The INDEX program is only designed to operate on the descriptor field of a file to produce a thesaurus of descriptor terms. The descriptor field may have been previously defined, most likely by EDIT when the file was created, but if not a /DESCRIPTOR FIELD/ control statement is required. This statement is also neccessary if the default delimiter, comma, is to be overridden by another character.

An index of any other field can be produced by using a /DESCRIPTOR FIELD/ statement to define it temporarily as the descriptor field with an appropriate delimiter. This overrides the previously nominated descriptor field, if any, as far as the present run of the INDEX program is concerned, but the original information in the input file remains intact for future use.

Printed index

The /NEW ID/ control statement is available to specify a heading for the printed output. Descriptor terms longer than 40 characters are truncated during printing of the index. Terms are printed in alphabetical order, each with its list of references on the following line or lines.

Punched card index

An optional /PUNCH/ control statement causes the index to be punched out on cards to produce a manual card index. This facility is particularly useful where a complete index of the whole file cannot be made because the file contains too many index terms.

In this case the file can be indexed in sections by including /SELECT/ control statements in separate runs to select successive sets of records. The punched card output from the different runs can then be merged, disstatementing duplicate descriptor headings, to produce a master index to the whole file.

The capacity of the program is limited to 2000 different descriptor terms referenced up to 2500 times.

Page width and depth

As in GALLEY the number of characters in a line and the number of lines per page can be adjusted with the /WIDTH/ and /DEPTH/ statements.

Sample control statements for INDEX

```
/ID/MASTER FILE
/NEW ID/ INDEX OF RECORDS 1001 - 2000
/SELECT/(1001-2000)
/DESCRIPTOR FIELD/(KEY)(;)
/PUNCH/
/WIDTH/(70)
/DEPTH/(40)
```

SEARCH

This program selects records from a Famulus file in response to requests for information.

The file to be searched must be correctly identified by an /ID/ control statement.

Searching subsections

The /SELECT/ statement may be used to indicate the record numbers which are to be searched. It is sometimes possible to use this facility to narrow the area of search to one or more subsections of the complete file. For instance, if a file is in chronological order the record numbers delimiting any particular period of interest will be known from the GALLEY listing. Selecting a subsection of a file in this way obviously cuts down processing time, but it has greater potential in conjunction with the /SEARCH/ formula to help define the set of records to be retrieved. In many cases, however, the attribute by which the file is ordered is not among the retrieval criteria, and there is then no alternative but to search the whole file. In this case no /SELECT/ statement is required.

Defining the fields to be searched

One or more fields of each record are scanned to determine whether it meets the criteria for retrieval, and a /FIELDS/ control statement is used to list the relevant field labels. The fewer the fields that have to be scanned the more efficient the search will be. If this statement is absent the descriptor field is used, and if no descriptor field was defined the program terminates with an error message. If no descriptor field was defined when the file was first created a /DESCRIPTOR FIELD/ control statement may be used to define one for the purpose of the SEARCH program, or if the descriptor field already exists, to change it. Bear in mind that the method of identifying terms depends upon whether the field is a descriptor field or not.

Printed output

The printed output produced by SEARCH is normally a listing in full of all the records that satisfy the /SEARCH/ requests. Two formats are available, the default listing and a tabular output. The /TABS/ statement produces the tabular list in exactly the same way GALLEY does. The default listing is identical to the default in GALLEY.

The amount of printing can be reduced if desired by a /NUMBERS/ control statement which results in record numbers only being listed. The /WIDTH/ and /DEPTH/ statements are available for changing the line width of the output and the number of lines per page, respectively. Spaces can be inserted between lines of the output with the /SPACE/ statement. The /NEW ID/ statement enables the page heading to be specified if it is to be different from the input file /ID/. The /PRINT NO NUMBERS/ statement suppresses the citation numbers from output.

Creating a new file

If required, a new file containing the retrieved records can be created by using a /WRITE TAPE/ (appropriate JCL will route output to any desired location) control statement, and its /ID/ will be the same as the page heading of the printed output.

The search formula

Retrieval of records from the input file is achieved by means of a formula on the /SEARCH/ control statement. The search formula is composed of terms combined with Boolean operators, written in free format.

Terms are defined according to the usual convention, broadly speaking, as phrases bounded by a delimiter in a descriptor field and words elsewhere. In this program, however, there are also two additional features, truncation and qualification, which are described later.

The three logical operators permitted in a search formula are and, or and not, represented in EBCDIC, the IBM 360 character code, by the characters &, | and ¬, respectively.

Use of the and operator implies that the user only wants to retrieve records in which all the terms joined by and are present. If a single one of the specified terms is missing, the record will not be retrieved. The or operator will retrieve records in which any of the specified terms are present. The not operator indicates that records containing the term which follows it will not be retrieved.

Parentheses should be used to avoid ambiguity as to the order in which the operations should be performed. There is no limit to the depth to which parentheses may be nested. Limits on the size of the search formula require that not more than fifty different terms (or sixty, including duplicates) for a total of 150 terms and operators be used in one formula.

Vocabulary lists

The descriptor field usually contains a controlled vocabulary and there is then no difficulty in choosing the correct terms, but for seaching any field with an uncontrolled vocabulary it is useful to refer to a list of the vocabulary in that field produced by COUNT or VOCAB.

Truncation of terms

For instance, a title field will contain an uncontrolled vocabulary, because you had no say in the choice of words used by the original authors in their titles. Several forms of the same word may occur -- for example, regenerate, regenerating, regeneration. In order to retrieve records containing any of these forms it is permissible to truncate on the right and specify a common substring -- e.g., regenerat or even regen -- though by using too short a form you run the risk of retrieving irrelevant words such as regent. Truncation on the left is not permissible.

Qualification of terms

The terms are normally searched for in the fields specified by the /FIELDS/ statement. Sometimes there is a need to include a term from another field, such as an author or date. This is done simply by following the term with the field label enclosed in parentheses.

SMITH(AUTH) or 1948(DATE)

Upper and lower case text

To search for upper and lower case text, prepare the data on Wylbur or use the Famulus flag characters described in Appendix C. For card usage, a /FLAGS/ card should precede a /SEARCH/ card.

Numbers

If you specify /NUMBERS/(0) before a /SEARCH/ command, Famulus will only report how many citations meet the search criteria. The command /NUMBERS/ without any argument will return a list of the citation numbers that met the search, as well as tell you how many items were found.

Multiple searches

Multiple searches of the file may be carried out by supplying more than one /SEARCH/ statement. The input file is rescanned for each search, and while there is no limit to the number of searches, the cost is obviously proportional.

At least one /SEARCH/ statement is obligatory. Not only is it the means by which criteria for record retrieval are expressed, it is also the signal for processing of the input file to begin, and therefore must follow all the other control statements.

Sample control statements for SEARCH

```
/ID/MASTER FILE
/FIELDS/(TITL,KEY)
/SEARCH/ SOIL STABILITY & (EROSION | SLIDES) & 196(DATE)
/SEARCH/(PANCHROMATIC | INFRARED | THERMAL | RADAR)
& AERIAL & 70MM
/NEW ID/THIRD SEARCH
/WIDTH/(70)
/DEPTH/(132)
/SPACE/(2)
/NUMBERS/(1-70)
/PRINT NO NUMBERS/
/SELECT/(7,100,25-30)
/WRITE TAPE/
```

COUNT and VOCAB

The COUNT program lists the vocabulary in specified fields of a Famulus file in alphabetical order with a count of the number of times each item occurs. Statistics concerning word occurances and word lengths are also printed.

The VOCAB program performs the same function except that word frequencies are not counted.

Though requiring less space than COUNT, VOCAB is relatively undeveloped, and parts of the following discussion do not apply to it, notably the /STOP LEVEL/ feature. A punched statement vocabulary list is produced automatically, and the /PUNCH/ control statement is not available. The /NEW ID/ and /DESCRIPTOR FIELD/ control statements are also unavailable. It is assumed that COUNT will normally be preferred.

Uses of vocabulary lists

Vocabulary lists have a number of uses: data validation, search formula construction, thesaurus building, and simple research on the information contained in the file.

Error detection

In the early stages of data base construction a vocabulary list will throw errors such as miss-spellings into prominence, so providing a check-list of errors for use in data correction. Proof-reading is not eliminated, because the errors still have to be located, but they can at least be traced to one of the fields, which narrows the area of search.

Breakdown of vocabulary by fields

The fields whose vocabulary is required are specified on a /FIELDS/ control statement, the descriptor field being the default. A /DESCRIPTOR FIELD/ statement will override any existing descriptor field. This feature allows vocabulary items consisting of phrases separated by any specified delimiter.

Vocabulary lists are often required to help construct search formulas, and then it is useful to know the fields in which particular items occur. A breakdown of the vocabulary by fields is not provided, however, and the only way to achieve

this result is to run the program repeatedly with a /FIELDS/ statement specifying a different field each time. Otherwise if more than one field is specified, a combined list is produced which will not show which field a word came from.

Stop-list compilation

Vocabulary lists are also useful for constructing a controlled thesaurus of index terms for use in the descriptor field. If the /PUNCH/ control statement is supplied, a punched card deck of the vocabulary is automatically produced, consisting of a list of words in alphabetical order, separated by commas. These cards may be modified and used in a later run following a /VOCABULARY/ statement in order to specify a stop-list of trivial words. Trivial and non-trivial vocabularies are then printed in separate lists. The modification to the card deck simply involves replacing the comma following every trivial word with an asterisk. This deck can also be used by the KEY program.

There is also provision for automatically transferring words from the vocabulary to the trivial list if they occur too frequently.

/STOP LEVEL/(25)

This statement will put any word occurring 25 times or more into the trivial word list in the printed output, and will mark it as trivial by an asterisk in the punched card output, if any.

Vocabulary lists

If any words are marked as trivial a list of trivial words in alphabetical order is printed first. The non-trivial vocabulary list is printed next, followed by the complete dictionary in order of word frequency with trivial words distinguished by a following asterisk. The word lists are printed in three columns across the width of the page. Each word, or phrase in the case of a descriptor field vocabulary list, is followed by its actual and percentage frequency of occurrence. If the actual frequency exceeds four decimal digits asterisks are printed in lieu.

Any item which is too long to be accommodated in the column is truncated to 33 characters. This is not likely to occur except when counting a descriptor field, because the longest word in the Oxford English Dictionary consists of 28 letters.

The VOCAB program provides no word frequency count and therefore allows up to 40 characters before truncating. The extra seven characters may sometimes be just enough to resolve ambiguity, which is the main occasion for using VOCAB in preference to COUNT.

Statistics of word types

Dictionary statistics are provided separately for the words in the stop-list and for the remainder of the vocabulary. Both sets of statistics consist of a table of word-length distributions followed by the number of entries, their average and maximum lengths, and details of the dictionary size. The word-length distribution table comprises four rows and ten columns. Each value in the table represents the number of dictionary entries having a certain number of characters. The first row gives the values for terms having one to ten characters; the second, for 11 to 20 characters; the third, for 21 to 30 characters; and the fourth, for 31 to 40 characters.

Statistics of word tokens

The distinction between types and tokens is fundamental. Word types hardly require explanation; they are simply the different words found in the input file and entered into the program's internal dictionary. When different instances of a single word type are encountered in the file they constitute separate word tokens.

Statistics of word tokens are provided, as for word types, both for trivial and for vocabulary words. In each case the distribution of word frequencies is tabulated under six headings across the page as follows:

R	the rank of N, increasing by one on successive lines.
N	the number of tokens of any one word type, in decreasing order.
F(N)	the number of word types having N tokens. This tends to increase as N decreases.
SIGMA(F(N))	the cumulative sum of word types having N or more tokens.
N*F(N)	the number of word tokens of rank R.
SIGMA(N*F(N))	the cumulative sum of word tokens of the SIGMA(F(N)) most frequent word types up to and including rank R.

Dictionary capacity

The dictionary limits on vocabulary size are either 4500 entries or 45000 characters. If either limit is exceeded the program will not proceed with the reading of the input file, but will output the results obtained up to that point.

This situation can easily arise with large files, especially if several fields are being scanned in a single job. This is another reason for scanning one field per run, though even this may not solve the problem for very large files. In such a case the vocabulary of the unprocessed portion of the file may be obtained by a subsequent run using the /SELECT/ statement. The starting point for the second run is obtained from the figure for the last citation inspected in the output from the first run.

The last citation inspected

Following the file identification information in the printed output the number of the last citation which was inspected is given. This will be the last record in the file, or the last record specified in a /SELECT/ statement, or the last record read before the capacity of the program was exceeded.

Sample control statements for COUNT

```
/ID/MASTER
/NEW ID/ABSTRACT VOCABULARY LIST
/FIELDS/(ABST)
/PUNCH/
/VOCABULARY/A*THE*AN*CRISIS,OF*IN*
/STOP LEVEL/(20)
```

KEY

The KEY program provides an automatic keywording facility for Famulus files, using existing fields as the source for key terms or descriptors. The program will scan one or more fields in a record and generate entries in a specified key field.

The key field

The field which is to receive the key terms is specified on the /KEY FIELD/ statement by its label enclosed in parentheses. Only one field label is permitted, and it must be one of the field labels already defined by EDIT when the input file was created, though the field need not necessarily contain any information yet. When creating a new file it is wise to pre-define more fields than are immediately required, just in case an unforseen need like this arises.

If the key field of any record is not empty, entries are simply added to the material already there. No entry is duplicated in the key field, even if it occurs more than once in the source fields.

Terms are separated in the key field by a single blank unless a separator is given on the /KEY FIELD/ statement. Any single character may be specified, enclosed by parentheses, following the field label. When a separator is supplied it is inserted followed by an extra blank between terms in the key field.

The /KEY FIELD/ statement is obligatory.

The source fields

Terms are identified as in MULTIPLY, i.e., strings bounded by a delimiter when scanning the descriptor field, and single words when scanning the other fields. Unlike MULTIPLY, however, KEY can operate on more than one field.

The fields to be used as the source for single word terms are specified on a /FIELDS/ statement, the descriptor field serving as the default. The /DESCRIPTOR FIELD/ statement is also available to define a source field and delimiter for terms consisting of bounded strings. This field becomes the implicit descriptor field of the output file, irrespective of the input file descriptor field.

Stop and go lists

KEY has an internal dictionary to store terms which are input via control statements. During processing of each record every term in the source fields is checked to find out whether it is in the dictionary or not. It is then only transferred to the key field depending upon whether the dictionary is considered to be a stop list of unwanted terms or a go list which excludes all other terms.

For example, the dictionary may represent a controlled thesaurus, i.e., a go list of terms which are required. In this case, a /GO LIST/ control statement is used to introduce the thesaurus, which is punched on statements in exactly the same form as for the /VOCABULARY/ statement of COUNT, with terms separated by commas. When operating with a go list the program rejects any words it finds which are not in the list.

Alternatively, KEY may be made to work with a stop list by means of a /STOP LIST/ control statement containing unwanted terms each followed by an asterisk. When the program operates in this mode these terms are rejected, but all terms not found in the dictionary are placed in the key field.

/GO LIST/ and /STOP LIST/ statements are mutually exclusive. If neither statement is used the program operates as if it were in stop list mode with an empty dictionary, with the result that all terms are transferred.

The syntax of stop and go lists has deliberately been made compatible with the punched card vocabulary provided by COUNT, so that these cards can be used for KEY with minimal changes to commas or asterisks. Starred words may be left in a go list, and they are ignored in order not to waste space in the dictionary. Similarly, words followed by a comma in a stop list are not added to the dictionary.

Synonyms

There is also a feature which limits the number of terms required on the thesaurus for the file. It is possible to define sets of two or more terms to be synonyms, one of which is considered the preferred synonym. When one synonym is found the preferred synonym of the set is entered in the key field.

The /SYNONYMS/ statement is used to specify synonyms. Each preferred term is followed by an equals sign and a list of synonyms separated by commas. There is a comma before the next preferred term.

Printed output

Apart from a listing of control statements and file identification information the printed output from KEY is limited to the first ten records, unless a /PRINT/ control statement is used to vary it. Page width can be adjusted using the /WIDTH/ statement.

Sample control statements for KEY

```
/ID/DRACUNCULUS BIBLIOGRAPHY
/NEW ID/ KEYED DRACUNCULUS BIBLIOGRAPHY
/FIELDS/(TITL,ABST)
/KEY FIELD/(KEY)(,)
/STOP LIST/  A*AN*THE*OF*FOR*OR*IN*ON*TO*BY*FROM*
INTO*SINCE*THEN*WORM,DISEASE,PARASITE*THEREFORE
/SYNONYMS/HELMINTH=HELMINTHIC,HELMINTHOLOGICAL,
HELMINTHOLOGIST,HELMINTHOLOGY,
INFECTION=INFECTED,INFECTIONS
/PRINT/(50)
/SELECT/(1-30,34,36,47-91,94-100)
/WIDTH/(65)
```

KWIC

The KWIC program (Key Word In Context) generates a concordance for a Famulus file. An alphabetical list of words is produced, with each word centred in a line containing as much as possible of the context to its immediate left and right. Each line also contains a number referencing the record from which it comes.

Restricting operation

Sections of the file can be processed by using the /SELECT/ statement to pick only the records to be indexed.

Specifying fields

As in the case of the KEY program, any field or combination of fields may be specified by means of a /FIELDS/ statement, and if no /FIELDS/ statement is supplied the implicit descriptor field serves as the default. A /DESCRIPTOR FIELD/ statement defines a field containing multi-word terms, and also the delimiting character which separates them.

Stop and go lists

A /STOP LIST/ or a /GO LIST/ statement may be used to restrict the number of terms to be concorded. Since a line of output is generated for every term token (see COUNT and VOCAB, Statistics of Word Tokens) found in the specified fields of the file the amount of printed output may be very large unless the frequently occurring terms are stopped. Alternatively, if only some known terms are of interest they can be put on a /GO LIST/ statement which will exclude all others.

Printed output

The width of the printed output can be adjusted using the /WIDTH/ statement.

Sample control statements for KWIC

```
/ID/UCI PROGRAM CATALOGUE.
/NEW ID/KWIC CONCORDANCE OF PROGRAM DESCRIPTION FIELD.
/FIELDS/(DESC)
/GO LIST/SYSTEM,MODEL,PROCESS,CONTROL
/WIDTH/(70)
```

SUMMARY OF Famulus STATEMENTS

NOTE: * INDICATES A REQUIRED STATEMENT
(*) INDICATES AN OPTIONAL STATEMENT

	EDIT	OSSIFY	SORT	MERGE	MULTIPLY	GALLEY
CITATIONS	(*)					
DELETE	(*)					
DEPTH						(*)
DESCRIPTOR FIELD	(*)				(*)	
FIELDS	*	(*)	*		(*)	(*)
FLAGS	(*)					
GO LIST						
ID	*	*	*	**[1]	*	*
KEY FIELD						
NEW ID	(*)		(*)	(*)	(*)	(*)
NUMBERS						
ORIGINAL	(*)					
PRINT	(*)			(*)	(*)	
PRINT BY FIELDS						(*)
PRINT BY SUBJECTS						(*)
PRINT NO NUMBERS						(*)
PUNCH						
REPLACE	(*)					
SEARCH						
SELECT		(*)	(*)		(*)	(*)
SPACE						(*)

[1] MERGE REQUIRES TWO /ID/ STATEMENTS AS WELL AS A /NEW ID/ STATEMENT.

NOTE: * INDICATES A REQUIRED STATEMENT
(*) INDICATES AN OPTIONAL STATEMENT

	EDIT	OSSIFY	SORT	MERGE	MULTIPLY	GALLEY
STOP LEVEL						
STOP LIST						
SYNONYMS						
TABS						(*)
VOCABULARY						
WIDTH	(*)				(*)	(*)
WRITE TAPE						

NOTE: * INDICATES A REQUIRED STATEMENT
(*) INDICATES AN OPTIONAL STATEMENT

	INDEX	SEARCH	VOCAB	COUNT	KEY	KWIC
CITATIONS						
DELETE						
DEPTH	(*)	(*)				
DESCRIPTOR FIELD	(*)	(*)		(*)	(*)	(*)
FIELDS		(*)	(*)	(*)	(*)	(*)
FLAGS		(*)				
GO LIST					(*)	(*)
ID	*	*	*	*	*	*
KEY FIELD					*	
NEW ID	(*)	(*)		(*)	(*)	(*)
NUMBERS		(*)				
ORIGINAL						
PRINT					(*)	
PRINT BY FIELDS						
PRINT BY SUBJECTS						
PRINT NO NUMBERS		(*)				
PUNCH	(*)			(*)		
REPLACE						
SEARCH		*				
SELECT	(*)	(*)	(*)	(*)	(*)	(*)
SPACE		(*)				

NOTE: * INDICATES A REQUIRED STATEMENT
(*) INDICATES AN OPTIONAL STATEMENT

	INDEX	SEARCH	VOCAB	COUNT	KEY	KWIC
STOP LEVEL				(*)		
STOP LIST					(*)	(*)
SYNONYMS					(*)	
TABS		(*)				
VOCABULARY			*	(*)	(*)	(*)
WIDTH	(*)	(*)			(*)	(*)
WRITE TAPE		(*)				

APPENDIX B
STATEMENT SYNTAX SUMMARY

column 1
↓

/CITATIONS/	appears immediately before the citations
/DELETE/(#,#-#)	maximum of 500 numbers, range counts as 2
/DEPTH/(#)	minimum of 13, no maximum
/DESCRIPTOR FIELD/(XXXX)(%)	XXXX=field label,%=any character to be used as a delimiter
/FIELDS/(FLD1,FLD2,...,LAST)	FLD1,etc are field labels separated by commas. Max is 10 labels.
/FLAGS/	
/GO LIST/AAAA,BB*CC,BBB...	if a comma follows a word, it is non-trivial. If an asterisk follows, the word is trivial.
/ID/AAAAAA.....	maximum text length is 100 characters.
/KEY FIELD/(XXXX)(%)	same as /DESCRIPTOR FIEID/ execpt (%) is optional with the default being a blank.
/NEW ID/AAAAAA.....	same as /ID/.
/NUMBERS/(#-#) or /NUMBERS/(0)	only one range allowed.
/ORIGINAL/	
/PPINT/(#,#-#)	maximum of 100 numbers, range counts as 2.
/PRINT BY FIELDS/	
/PRINT BY SUBJECTS/	
/PRINT NO NUMBERS/	
/PUNCH/	

column 1
▼

/REPLACE/(#,#-#)(XXXX)*OLD*NEW*	# or #-# = a citation number or a range of numbers. XXXX = field label.
/SEARCH/boolean search formula	see section on SEARCH main program.
/SELECT/(#,#-#)	maximum of 100 numbers, range counts as 2
/SPACE/(#)	
/STOP LEVEL/(#)	
/STOP LIST/AAA,BB*CCC*DDDD.....	same as /GC LIST/
/SYNONYMS/AAA=BBB,CCC....	AAA is primary word
/TABS/(#,#,#,...,#)	maximum of 10 numbers, maximum value is 128.
/VOCABULARY/AAA,BBB*CCC*DDD...	same as /GO LIST/.
/WIDTH/(#)	for printed material, min=20,max=128 for "punched" material, min=6,max=80
/WRITE TAPE/	

APPENDIX C

Card Input and Famulus Flag Characters

Lower case letters can be generated on card input to Famulus by the use of certain flag characters inserted in the data. A list of the flag characters and their operation follows. Certain redundancies allow flexibility for the user.

> Greater than causes all letters up to the next flag character to be converted to lower case. Numeral and special characters are not affected.

< Less than switches off the conversion of letters to lower case if this is in effect, i.e., letters are left in upper case up to the next flag.

* Hash switches case mode. If lower case conversion is in effect, * switches to all upper case. If the reverse is true, the * switches to the conversion to lower case.

_ Underline operates the switch like the hash, but it affects only the following character. This is useful for capitalizing a single character in a sentence.

! Exclamation denotes a flag character (including ! itself) to literal status, i.e., the following flag character does not operate the conversion switch in its usual way, but is included in the text like an ordinary character instead of being removed as flag characters normally are. ! is ignored if the next character is not a flag.

APPENDIX D

USING Famulus AT U.C. SANTA BARBARA

A set of catalcgued procedures (PROCs) have been written to allow easy access to the Famulus system on the UCSB IBM 360-75. The convention chosen to name the PROCs is as follows: to read and create Famulus files cn 3330 disk the PRCC name is a 'D' follwed by the program name. Thus to use prcgram EDIT the appropriate PROC for disk would be DEDIT. (Note: since PROC names are limited to 8 characters, Famulus program MULTIPLY is referenced for disk use by the proc DMULT.)

To use any Famulus prcgram you will need:

1. A JOB statement.
2. An EXEC statement, with appropriate symbolic paramaters.
3. Your Famulus control statements (and input citations if creating or adding to a file).
4. A '/*' (slasn-asterisk) jot step delimiter.

The symbolic parameters used for Famulus are:

1. INVCI - - Tells Famulus what disk ycu wish to access
2. INFILE - - Gives the DSNAME of the file you wish to access (FT01F001).
3. OUTVCI - - Tells Famulus what disk to store your output on.
4. OUTFILE - - Gives the DSNAME of the new file you are creating (FT02F001).
5. ADDVOL and ADDFILE - - Are used in a similar way with the MERGE program (FT03F001).
6. CITVOL and CITFILE - - are used in EDIT when input citations are on tape or disk.

Note that DSNAMES can be qualified, e.g. 'Ron.Example'. Each term in the qualified name must be eight or fewer characters in length, and cannot include special characters. Qualified names must be placed in single quotes.

The following example shows the JOB statement and the EXEC statement for creating an original Famulus file, then illustrative Famulus control statements.

APPENDIX D

USING Famulus AT UCSB

EXAMPLE OF ORIGINAL EDIT RUN, CREATING A NEW FILE

```
//ANYNAME  JOB  (1234,YOURNAME)
// EXEC  DEDIT,OUTVOL=YOURVOL,OUTFILE='EXAMPLE.EDIT1'
/ID/EDIT1
/FIELDS/(AUTH,TITL,IN,PUBL,KEYW,ABST,LOCT,USER)
/DESCRIPTOR FIELD/(KEYW)
/ORIGINAL/
/CITATIONS/

.............INPUT CITATIONS IN Famulus FORMAT HERE.............

/*
```

DEVELOPMENT OF A PHYSICAL SECURITY DATA MANAGEMENT SYSTEM VOLUME III – SYSTEM OUTPUTS: MASTER LIST, KEYWORD INDEX AND KEYWORD COUNT

by

J. Caldwell
P. Benner
D. Solomonson

April 1980

Prepared for

CIVIL ENGINEERING LABORATORY
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735 State Street
P. O. Drawer 719
Santa Barbara, CA

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A084 840	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) DEVELOPMENT OF A PHYSICAL SECURITY DATA MANAGEMENT SYSTEM; VOLUME III—SYSTEM OUTPUTS: MASTER LIST, KEYWORD INDEX AND KEYWORD COUNT	5. TYPE OF REPORT & PERIOD COVERED Final Report for Period 1 Oct 78 — 31 Jan 80
	6. PERFORMING ORG. REPORT NUMBER MRC-R-531
7. AUTHOR(s) J. Caldwell, P. Benner, D. Solomonson	8. CONTRACT OR GRANT NUMBER(s) DNA 001-79-C-0182
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Physical Security
Data Management
Information System
Computerized Information Storage and Retrieval
VOLUME III

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

~~This report~~ presents the system outputs of the Physical Security Data Management System. Three separate outputs are presented: the Master List, the Keyword Index and the Keyword Count. The Master List consists of 201 individual bibliographical records produced by the Physical Security Data Management System. It consists of 16 pages of computer output. Each individual record consists of a full bibliographical citation, a keyword list, technical annotations, relating to physical security, and an abstract. The Keyword

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11. CONTROLLING OFFICE NAME AND ADDRESS Civil Engineering Laboratory Naval Construction Battalion Center Code CEL-L-61, Port Hueneme, California 94043	12. REPORT DATE January 1980 13. NUMBER OF PAGES 29
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION DOWNGRADING SCHEDULE
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20 (continued)

Index consists of a complete alphabetical listing of all keywords currently in the Data Management System's controlled vocabulary that can be used for retrieval of bibliographical records stored in the Master List. The Keyword Count is divided into two parts. The first part consists of an alphabetical listing of all keywords currently in the Data Management System. Opposite each keyword is the absolute number of times the keyword appears in separate bibliographical records followed by the percentage of this frequency. The second part consists of a listing of all keywords currently in the Data Management System arranged according to frequency, from highest to lowest. Opposite each keyword is the absolute number of times the keyword appears in separate bibliographical records followed by the percentage of this frequency. A separate report, the User's Manual, describes utilization of these outputs in more technical detail.

CONTENTS

SECTION 1
MASTER LIST

This section presents the Master List of a sample of 50 individual bibliographical records produced by the Physical Security Data Management System. It consists of 16 pages of computer output.

Volume II, the User's Manual, presents detailed instructions on how to use the Master List.*

---

* Caldwell, J., Benner, P., and Solomonson, D., Development of a Physical Security Data Management System, Volume II, User's Manual, MRC-R-531, Mission Research Corporation, November 1979.

1 ACNO BK00001
YEAR 1976
AUTH Moore, Kenneth
TITL Airport, Aircraft and Airline Security (355)
PUBL Publisher: Security World Publishing Co., Inc.
KEYW Hijacking; Types of Entry, Threats; Air Piracy; Air Cargo Thefts; Physical Security Policy and Procedure; Security Administration & Management; Security Inspection; Personnel; Airports; Facilities, Locations; Cargo Terminals
NOTE Skyjacking; Ticket Fraud; Airport Screening
ABST The subject of airport, airline and aircraft security. Problems and solutions in preventing hijacking and in protecting cargo and baggage are covered in detail. Credit card fraud and ticket stock security are thoroughly covered. A review of government regulations and airport security is a useful reference chapter.

2 ACNO BK00002
YEAR 1977
AUTH Walker, Bruce J.; Blake, Sam F.
TITL Computer Security and Protection Structures (143)
PUBL Publisher: Dowden, Hutchinson and Ross, Inc., Stroudsburg, Pennsylvania Performing Organization: University of WAterloo
KEYW Computer Security; Control, General; Power Supplies; Espionage; Types of Entry, Threats; Inside Jobs; Method of Entry
ABST Because the possible threats to a computing facility and the information contained therein determine the security measures that should be investigated, a survey of both internal and external threats is included.

3 ACNO BK00003
YEAR 1973
AUTH Post, Richard S.
TITL Determining Security Needs (263)
PUBL Publisher: Oak Security Publications Division
KEYW Security Checklists; Security Administration & Management; Physical Security Evaluation; Security Inspection; Security Personnel
NOTE Plant Security; Security Audit; Security Philosophy
ABST Background readings on security philosophy methods, procedures and policy development; a detailed plan for the conduct of security surveys; a comprehensive checklist for analyzing security problems sample surveys of a wide variety of plants and facilities. The purpose is to provide a basis for the conduct of security systems in a systematic, logical and concise manner.

4 ACNO BK00004
YEAR 1972
AUTH Peel, John D.
TITL Fundamentals of Training for Security Officers (325)
PUBL Publisher: Charles C. Thomas Publisher
KEYW Physical Security Policy and Procedure; Security Administration & Management; Security Manuals; Security

Personnel; Personnel
ABST To supplement or reinforce any security officer's professional knowledge. A collection of methods and facts slanted toward the practical knowledge of which the private security officer needs.

5 ACNO BK00005
YEAR 1973
AUTH Post, Richard S.; Kingsbury, Arthur A.
TITL Security Administration: An Introduction (361)
PUBL Publisher: Charles C. Thomas Publisher, 2nd Ed.
KEYW Physical Security Evaluation; Security Administration & Management; Security Manuals; Security Personnel; Orientation, Education, and Training; Physical Security Policy and Procedure
ABST Introduction and in-depth study of security administration. A valuable tool in determining an effective security program. Part I presents history and philosophy of security and provides the legal basis for security activities. Part II presents component parts of security function. Part III presents aplication of security components into integrated programs. Part IV presents procedures and techniques. Part V includes appendices (materials dealing with security equipment, shoplifting laws, related security materials), and a glossary of security terminology.

6 ACNO OR00001
YEAR 1978 12
RCNO SAND 78-0400; AT(29-1) 789
AUTH Poli, David L.
TITL Security Seal Handbook; (44)
PUBL Performing Organization: Sandia; Controlling Office: Department of Energy;
KEYW Access Controls; Control, General; Access Control Systems; Tamper Devices; Alarm Technology;
NOTE Security Seals
ABST This handbook describes the security seal system philosophy, provides descriptions, evaluation information, installation guidelines, and verification instructions for available seals, and supplies information on the development of new seals

7 ACNO OR00002
YEAR 1976 06
RCNO J-LEAA-022-74
AUTH Carlston, Robert A.; De Witt, Phillip D.; Hanes, Lewis; Pesce, Edward
TITL Crime Prevention Through Environmental Design (40)
PUBL Performing Organization: Westinghouse Electric Corporation Controlling Office: National Institute of Law Enforcement and Criminal Justice Monitoring Agency: Law Enforcement Assistance Administration
KEYW Architectural Designs; Facilities, Locations; Residential Facilities; Environmental Effect; Control, General; Parking Facilities
ABST Institute-sponsored research has studies how the

environment influences the problems of crime and fear of crime. Early efforts in the limited setting of public housing by Newman indicated that, by intelligently shaping our environment, the opportunities for crimes to occur can be reduced. These positive signs led to the Institute to expand the scope of study to encompass other, more common settings. In 1974, a major program of Crime Prevention Through Environmental Design (CPTED) was launched. Residential, commercial, and school environments and the predatory, fear-producing crimes in each are the focus of this program. This document encapsulates the highlights, concepts, and future plans of the CPTED Program. It is not a progress report, but rather an exposition.

8 ACNO OR00003
YEAR 1979 09
AUTH Roach, Sharon; DeLoatch, Beatrice; Murphy, T.E.
TITL Crime in Service Industries (124)
PUBL Controlling Office: U.S. Department of Commerce, Domestic and International Business Administration
KEYW Computer Security; Burglaries; Robberies; Holdups; Personnel Selection; Physical Security Evaluation; Security Personnel
NOTE Credit Card Losses; Bad Checks; Crime Prevention
ABST Report discusses the impact of crime on the service sector, the cost of crimes against business. Provides an overview of the problem as well as chapters on individual services. Specific vulnerabilities, losses and applicable deterrent measues are identified. Computer crime, employee theft, bad checks are discussed.

9 ACNO OR00004
YEAR 1977 04
AUTH Kennel, R.P; Moler, R.M.
TITL Explosives Control Overview (20)
PUBL Performing Organization: The Aerospace Corporation Controlling Office: Law Enforcement Assistance Administration
KEYW Explosives; Method of Entry; Terrorist Attacks; Terrorist Threats; Types of Entry, Threats; Access Control Systems; Control, General; Identifier Elements
NOTE Threat
ABST The Explosives Control Overview was presented at the 1977 Carnahan Conference. The outline includes 1) explosives problem summary; 2) threat summary; 3) operational consideration; 4) technical overview; 5) current programs status.

10 ACNO OR00005
YEAR 1973 02
RCNO ESD-TR-73-106; F19628-70-C-0217
AUTH Papek, Gerald J.
TITL Access Control Models (145)
PUBL Performing Organization: Center for Research in Computing Technology, Harvard University Controlling Office: Deputy for Command & Management System, Hq. Electronic Systems Division (AFSC)

KEYW Access Controls; Control, General; Computer Security
NOTE Multiuser computer systems; Computer networks; Data bases; Access control; Restriction graph; Minimum implementation; Complimentation constraint
ABST Examines some of the technical aspects of efficiency and reliability which are affected by access control in complex, multiuse data bases. A model, its theoretical basis, and algorithms reprsentations of access control relationships for a number of conditions are presented. The issue of reliability in the control of access to information in a shared data base is also discussed.

11 ACNO OT00004
YEAR 1977 01
RCNO DA PAM 108-1
TITL Index of Army Motion Pictures and Related Audio-Visual Aids (292)
PUBL Performing Organization: Headquarters, Department of the Army
NOTE Motion Picture Index; Army Motion Pictures; Audio-Visual Aids
ABST DA PAM 108-1 is the official DA catalog and contains complete information of all audiovisual products which are available for distribution.

12 ACNO OT00005
YEAR 1977 07
AUTH Wallach, Charles; Ricci, Roy Dr.
TITL Security Metal Detection Systems (6)
PUBL Publisher: American Society for Industrial Security Controlling Office: INTEXT Inc.
KEYW Alarm Technology; Metal Sensors; Alarm Sensors; Surveillance Methods; Control, General; Weapons Detection
ABST Discusses passive, magnetometer metal detectors; active continuous wave metal detectors and pulsed field systems. A review of how to select the most effective detector related to particular applications.

13 ACNO OT00006
AUTH Keeney, Harry W.; Kellem, C.
TITL Directory of Security Product Manufacturers; (25)
PUBL Controlling Office: National Crime Prevention Institute, School of Police Administration
KEYW Builders Hardware; Builders Hardware; Manufacturers Association; Alarm Equipment Distributors
NOTE Security Products; Security Product Manufacturers; Security Equipment
ABST Directory of Security Products Manufacturers

14 ACNO OT00007
YEAR 1972
AUTH Hudiburg, Everett; McCoy, Carl E
TITL Forcible Entry, Rope and Portable Extinguisher Practices (179)
PUBL Publisher: Fire Protection Publications, OK State University Controlling Office: International Fire Service Training Association

KEYW Forced Entry Methods; Method of Entry; Forced Entries; Types of Entry, Threats; Breaching Aids; Roofs; Windows; Doors; Walls
ABST The manual deals with building construction and how to force entrance into buildings, fire service rope practices, and portable fire extinguishers. Revised in its present form according to the requirements prescribed by an editorial committee of the International Fire Service Training Assoc.

15 ACNO OT00009
YEAR 1975
AUTH Saxon, Kurt
TITL Fireworks and Explosives like Granddad Used to Make (61)
KEYW Explosives; Breaching Aids
ABST Late 1800's guide to homemade, handmade explosives, fireworks, chemicals and bombs. Current information on bomb and explosive handling and protection.

16 ACNO PC00005
TITL Panic Deadbolt Lock-Exitguard (3)
PUBL Publisher: Alarm Lock Corporation
KEYW Lock Technology; Panic Bolts; Bolts; Dead Bolts; Dead Locks
ABST Exitguard provides a sturdy deadbolt in addition to a patented deadlatch to resist intrusion, yet it opens with finger tip pressure if emergency exit is required.

17 ACNO PC00006
RCNO 85
TITL Digital Key, Digital Access Control Systems (5)
PUBL Controlling Office: ASC Security Systems, LTD.
KEYW Access Control Systems; Entry Control Devices;
NOTE Digital Keys
ABST Illustrated catalog of ASC line of digital access control system equipment and devices. Price list and product description included.

18 ACNO PC00007
TITL A.P.D. Security Systems (4)
PUBL Performing Organization: A.P.D. Automatic Parking Devices, Inc.
KEYW Access Controls; Control, General; Combination Locks; Lock Technology; Lock Devices; Access Control Systems
ABST Product literature includes A.D.P. security locks, recycling locks, code combination locks, card locks, and digital print reader.

19 ACNO PC00008
YEAR 1974 09
AUTH Arrow Lock Corporation
TITL Heavy Duty Mortise Lock Sets (11)
KEYW Lock Parts; Mortise Cylinders; Dead Bolts; Inner Plates
NOTE Dead Lock; Knobs
ABST The mortise lock is designed for heavy use in schools, hospitals, and commercial buildings. Product literature discusses and illustrates variety of mortise locks and

corresponding attachments and accessories.

20 ACNO PC00010
TITL Best Security Systems-Padlocks (3)
PUBL Publisher: Best Lock Corporation
KEYW Lock Types; Lock Technology; Padlocks
ABST Discusses parts, accessories and options for all. Best padlocks. Types and sizes of padlocks available are also discussed.

21 ACNO PE00001
YEAR 1979 02
AUTH Tinnon, David B; Halevy, David
TITL Strike Teams; Playboy; Volume 26; No. 2 (10)
PUBL Publisher: Playboy Enterprises, Inc.
KEYW Terrorist Attacks; Terrorist Threats; Hijacking; Air Piracy; Forced Entry Methods; Methods of Entry; Breaching Aids; Bugging; Security Administration & Management; Personnel Selection; Facilities; Airports
NOTE Project Blue Light; Black Berets; Small Arms; Foreign Strike Forces
ABST Presents an inside look at Commando organizations that nave been formed specifically to combat terrorists, particularly hijackers. Describes Project Blue Light, the US 180 man antiterrorist force patterned on British, Israeli and West German units. Project Blue light training and recruitment briefly described. Foreign antiterrorist organizations are described, including the British Special Air Services, the West German Group Nine of the of the Border Guard, and the Israeli 269th Headquarters Reconnaissance Regiment. A sidebar presents a brief evaluation of terrorist and antiterrorist small arms. Principal purpose of the article supports the claim that the US has an antiterrorist strike force.

22 ACNO PE00002
YEAR 1979 10
AUTH Toth, Robert C.
TITL Fires Afloat, Arson Cases Signal Stormy Seas for Navy; Los Angeles Times; (2)
PUBL Los Angeles Times
KEYW Types of Entry, Threats; Arson; Vandalism; Methods of Entry; Inside Jobs; Personnel Selection; Physical Security Policy and Procedure; Facilities; Ships and Boats
NOTE Naval Investigative Services 1979 data on 12 ship fires, $4.25 million damage.
ABST Twelve fires have broken out aboard 12 U.S. Navy ships in 1979 causing $4.25 million in damage according to the Naval Investigative Service. The NIS has drawn a composite profile of a Navy arsonist based on the traits of 15 suspects. Outbreak of arson more serious than other services. In 1978, the Navy had 128 cases of suspected or confirmed arson. The Army had 49 cases causing $33,000 worth of damage and the Air Force had 81 fires causing $78,640 in damage. Explanations for the outbreak are multiple. Social problems of society are transplanted on ships. Navy has higher disertion rate than other

Services. Ships are on station longer. There are fewer ships. There is no evidence that the problems are racial. he current problem is unlike the race riots of 1970-72 in the Pacific Fleet.

23 ACNO PE00003
YEAR 1977 03
AUTH Mendelson, Fred; Kuhns, Roger; D'Addario, Francis; Anderson, Edwar'; Parker, Brian
TITL Security Management; Vol. 21, No. 1
PUBL Publisher: American Society for Industrial Security
KEYW Photo Electric Alarm Systems; Alarm Technology; Detection Systems; Identifier Elements; Espionage; Types of Entry, Threats; Security Inspection; Security Administration & Management; Physical Security Planning
NOTE Photo I.D. System; Industrial Espionage
ABST "The Great (Photo ID) Card Game" by Mendelson, F.; "Photo Identification" by Kuhns, R.; "Development of Security Self Sufficiency: Survival of the Urban Retailers" by D'Addario, F.J.; "A Study of Industrial Espionage: Part II" by Anderson, Edward

24 ACNO PE00004
YEAR 1978 11
TITL Security Surveyor; Vol. 4, No. 4
PUBL Publisher: Victor Green Publications Ltd.
KEYW Residential Facilities; Facilities, Locations; CCTV Surveillance Systems; Surveillance Methods; Control, General; Vandalism; Types of Entry, Threats; Electromechanical Devices; Alarm Technology; Electronic Security Systems
NOTE Community Crime Prevention; Domestic Residential Security
ABST Articles in this issue include, "Surveying Domestic Residences"; "CCTV and It's Applications"; "Crime and the Community"; "Electronics for the Security Man"; "IF SSEC '79 - Conference Program"

25 ACNO PE00005
YEAR 1979 01
TITL Security Distributing and Marketing; Vol. 9, No. 1
PUBL Publisher: Security World Publishing Co., Inc.
KEYW UL Listed; UL Certificated; Control, General; Ultrasonic Frequency; Alarm Technology
NOTE Landlord Liability
ABST "Burglar Alarm Certification" by Oppen, Lary; "ISC/Los Angeles 1979" and "Overcoming Ultrasonic Noise" by Mioduszewski, Frank

26 ACNO RD00001
YEAR 1977 05
RCNO 2209
AUTH Fite, R.A.
TITL Commercial Perimeter Intrusion Detection Equipment Evaluation (117)
PUBL Performing Organization: Counter Intrusion Laboratory, Intrusion Detection Division, DRDME-XI; U.S. Army Mobility Equipment Research and Development Command Controlling

Office: Counter Intrusion Laboratory
KEYW False Alarms; Active Intrusion Sensors; Area Sensor; Interior Perimeter Protection; Fence Alarms; Intrusion Alarm Data; Intrusion Detection Alarms; Electromagnetic Interferance; Access Controls; Infrared Motion Detectors; Microwave Alarm Systems
ABST Describes the test program performed by Meradcom to determine the performance and reliability characteristics of a number of commercially available outdoor perimeter sensors. Each sensor was subjected to detection, nuisance alarm, electromagnetic interference, temperature and salt spray tests to determine effectiveness.

27 ACNO RD00002
YEAR 1978 03
RCNO 2237
AUTH Garrett, William C.
TITL Infrared Motion Sensor Evaluation (147)
PUBL Performing Organization: Counter Intrusion Laboratory, Intrusion Detection Division, DRDME-XI; U.S. Army Mobility Equipment Research and Development Command Controlling Office: Counter Intrusion Laboratory
KEYW Infrared Motion Detectors; Motion Sensors; Active Intrusion Sensors; Intrusion Alarm Data; Alarm Systems - Detection Systems; Intrusion Detection Alarms; Physical Security Evaluation; Program Testing
ABST Describes the test program performed by MERADCOM to determine the performance and reliability of Model 19-115 Infrared Intrusion Sensor. Three commercial infrared sensors were included in the test program to establish a baseline. Each was subjected to detection, nuisance alarms, electromagnetic interference and temperature to determine effectiveness. Detailed performance data is included.

28 ACNO RD00003
YEAR 1977 10
RCNO DOD 5220.22-M
TITL Industrial Security Manual for SafeGuarding Classified Information (18)
PUBL Performing Organization: Sargent and Greenleaf, Inc. Controlling Office: Department of Defense
KEYW Dead Bolts; Combination Lock Parts; Combination Locks-UL Designations; Padlocks; Electric Locks; Lock Technology
ABST Excerpts from DOD 5220.22-M Industrial Security Manual intented to assist in selection of locks for maximum security application.

29 ACNO RD00004
YEAR 1978 10
RCNO OPNAVINST 5510.45C
TITL Revision of U.S. Navy Physical Security Manual (197)
PUBL Controlling Office: Department of the Navy, Chief of Naval Material
KEYW Security Infractions; Physical Security Policy and Procedure; Security Manuals; Security Personnel; Classified Material; Physical Security Planning

ABST Draft revision to the U.S. Navy Physical Security Manual.

30 ACNO RD00005
YEAR 1978 12
RCNO OPNAVINST 5510.1F
TITL Information Security Program Regulation (304)
PUBL Controlling Office: Department of the Navy, Office of Chief of Naval Operations
KEYW Security Infractions; Physical Security Policy and Procedure; Security Manuals; Security Personnel; Classified Material; Physical Security Planning; Classification Management; Classified Material Reproduction; Classified Transmissions
ABST The instruction provides all Department of Navy activites and personnel with Department of Defense and Navy regulations and guidance for classifying and safeguarding classified information.

31 ACNO RD00006
YEAR 1979 08
RCNO NAVFAC Y0995-01-005-251
TITL Window and Vent Barrier Evaluation; (49)
PUBL Performing Organization: Sandia Laboratories Controlling Office: Dept of Defense Monitoring Agency: Dept of the Navy
KEYW Windows; Forced Entry Methods; Window Guards; Breaching Aids; Barrier Penetration;
NOTE Vents;
ABST A number of forcible entry attacks were made at Sandia Laboratories against a variety of specimens designed to replicate barriers specifed in Navy and DOD directories. In addition to the commonly specified DOD designs, 4 CEL selections (7/8" diameter tool resistant and mild steel jailbars, riveted steel grating, grip strut panels) were also tested.

32 ACNO RD00026
YEAR 1975 05
RCNO ONI-CP-61-5-75
TITL Damage Incidents Affecting the Department of the Navy (39)
PUBL Performing Organization: Naval Investigative Service, Naval Intelligence Command
KEYW Ships and Boats; Facilities, Locations; Port Facilities; Arson; Types of Entry, Threats; Vandalism
ABST Contains cronological summaries of incidents of damage during 1 October through 31 December 1974, affecting the Department of the Navy and investigated by the Naval Investigative Service. There were 167 incidents of damage during the fourth quarter of 1974, of which 149 cases were closed.

33 ACNO RD00029
YEAR 1977 04
RCNO 2208
AUTH Fite, R.A.
TITL Joint Services Perimeter Barrier Penetration Evaluation (63)

PUBL Performing Organization: Counter Intrusion Laboratory, Intrustion Detection Divison, DROME-XI, U.S. Army Mobility Equipment Research and Development Command; Controlling Office: Counter Intrusion Laboratory, DROME-XI, U.S. Army Mobility Equipment Research and Development Command
KEYW Breaching Aids; Method of Entry; Barrier Penetration; Fences; Builders Hardware
NOTE Barrier Penetration; Chainlink Configuration; Barbed Tape Barriers
ABST Describes the evaluation of various chain link fences and barbed tape barriers to determine their effectiveness. 20 difference fence and barbed tape barriers were erected and evaluated against a variety of covert and overt penetration methods.

34 ACNO RD00030
YEAR 1977 06
RCNO NBIR 77-12262; DNA IACRO 77-805
AUTH Moore, B.T., Carpenter, R.J., Koenig, A.L.
TITL Computerized Site Security Monitor and Response System (44)
PUBL Performing Organization: National Bureau of Standards, Department of Commerce Controlling Office: Defense Nuclear Agency
KEYW CCTV Surveillance Systems; Control, General; Intrusion Alarm Data; Alarm Technology; Computer Security; Electronic Security Systems; Sensor Signals; Alarm Monitors; Sound Sensors
NOTE Adversary Scenarios; Automated Response Systems; Distributed Processing; Monitoring Systems; Physical Security; Sensor Systems
ABST The Computerized Site Security Monitor and Response System (CSSMRS) was conceived as an integrated state-of-the-art, computer-based system to enhance and improve the overall phsyical security of storage sites for special weapons and materials. Many of the attributes, capabilities, and features developed during the course of work are set forth. Some of the alternatives are identified as are areas where additional work will be necessary to reach clearly identifiable and attainable objectives necessary to complete the system definition.

35 ACNO RL00001
YEAR 1976 11
RCNO 111-1238-911; GDC-ERR-AN-1134
AUTH Campbell, M.D.; O'Barr,G.L.; Pynchon, G.E.
TITL Development of Ballistics Test Facility and Evaluation of Vulnerability of Aircraft Materials (46)
PUBL Performing Organization: General Dynamics, Materials Research Group, Convair Division Controlling Office: General Dynamics
KEYW Armored Doors; Builders Hardware; Armor Plates; Bullet Proof; Hardware Properties-Composition; Thickness; Airports; Facilities, Locations
NOTE Ballistics Test Facility
ABST An in-plant facility was constructed at General Dynamics Convair's Kearny Mesa Site for the purpose of studying the

behavior of aircraft armor materials and structures when impacted by military projectiles up to caliber .50 and secondary fragments, while subjected to service environments. The facility was designed to permit testing of structural materials, full-scale structural configuration test sections, and lightweight armor specimens. Following an initial program to evaluate performance of the facility, the facility was used to study the damage to 7075-T651 aluminum plates, and the survivability of CL-84 power train shafting when subjected to caliber .50 AP M2 impacts under a simulated service condition.

36 ACNO RL00002
YEAR 1971 10
RCNO OP-44P, Ser. 10131P44
TITL Incidents of Malicious Damage of Sabotage in The Navy (66)
PUBL Performing Organization: Physical Security Organization Study and Planning Group Controlling Office: Chief of Naval Operations, Department of the Navy Monitoring Agency: Deputy Chief of Naval Operations
KEYW Physical Security Evaluation; Security Administration & Management; Physical Security Planning; Physical Security Review Committees; Physical Security Policy and Procedure
ABST In reference to an examination by the Navy Physical Security Organizaiton on the need for a centralized organization to establish policy, provide guidance, develop equipment and coordiante the many facits involved in physical security. The Advisory Committee members unanimously approved the conclusions and recommendations of the Study Group, except for the location for the new organization. Three potention locations are presented for review.

37 ACNO RL00003
YEAR 1972 02
TITL Technical Evaluation of Holobeam SC20: Secure Personnel Access Control System (14)
PUBL Performing Organization: Technical Branch-Division of Security Atomic Energy Commission
KEYW Personnel; Security Administration & Management; Access Control Systems; Control, General; Access Controls; Card Exchange Systems; Monitoring Stations; Alarm Technology; Identifier Elements; Remote Station Alarm System
ABST The Holobeam Secure Personnel Access Control System (SPACS) Model SC-20 is described as a system providing positive identification of authorized personnel as a condition of allowing them access to a protected area. The system consists of four major components: access card, card reader console, remote unit and connector cable.

38 ACNO RL00004
YEAR 1977
RCNO TN-1469
AUTH Gray, K.O.
TITL Externally Generated Light (EGL) Systems for Hyperbaric/Hypobaric Chambers (51)

PUBL Performing Organization: Civil Engineering Laboratory, Naval Construction Battalion Center Controlling Office: Civil Engineering Laboratory, Naval Construction Batallion Center Monitoring Agency: Naval Facilities Engineering Command
KEYW Lighting; Builders Hardware; Interior Lighting; Infrared Motion Detectors
NOTE Diver; Recompression Chambers; Hyperbaric Chamber
ABST Lighting systems for hyperbaric/hypobaric chambers are described. Methods of interior illumination without introduction of any potential fire source in the chamber are presented. The systems utilize light generated ouside of the chamber environment, filtered for reduction of infrared radiation, and then introduced through either large or small transparent hull penetrations.

39 ACNO RL00005
YEAR 1976 06
TITL Automatic Vehicle Monitoring Systems Study, Report of Phase 0; (97) Vol. 2
PUBL Performing Organization: Jet Propulsion Laboratory, California Institute of Technology Controlling Office: National Science Foundation
KEYW Monitoring Stations; Alarm Technology; Sensor Signals; Vehicle Traffic Control; Control, General
ABST A set of planning guidelines is presented to help law enforcement agencies and vehicle fleet operators decided which automatic vehicle monitoring (AVM) system could best meet their performance requirements. Improvements in emergency response times and resultant cost benefits obtainable with various operational and planned AVM systems may be synthesized and simulated by means of special computer programs for model city parameters applicable to small, medium and large urban areas. Design characteristics of various AVM systems and the implementation requirements are illustrated and costed for the vehicles, the fixed sites and the base equipments. Vehicle location accuracies for different RF links and polling intervals are analyzed. Actual applications and coverage data are tabulated for seven cities whose police departments actively cooperted in the JPL study. Volume 1 of this Report is the Executive Summary. Volume 2 contains the results of systems analyses.

40 ACNO RL00006
YEAR 1972 12
RCNO 74-09
AUTH Samuels, David M.; Thein, Brenda K.; Shank, E.B.
TITL Operational Tests of the Coherent Optical Fingerprint Identification System (COFIDS) (30)
PUBL Performing Organization: US Army Land Warfare Laboratory, Aberdeen Proving Ground Controlling Office: Department of Defense
KEYW Fingerprint Identification Systems; Control, General; Access Control Systems; Entry Control Devices
ABST This system employs the techniques of optical holography to encode fingerprint details and store such information,

with high data density, on miniature photographic films. Identification is performed by comparing fingerprints with the hologram using optical cross-correlation. The test, involving over 100 people of USALWL, was carefully designed and instrumented to provide complete statistics of performance. The evaluation indicates that the system provides a highly foolproof means of personnel identification.

41 ACNO RL00007
AUTH Thompson, J.R.; Gray, K.O.; Self, H.L.; Brier, F.W.
TITL Physical Security: Technical Memoranda and Progress Reports
PUBL Performing Organization: Civil Engineering Lab Controlling Office: Naval Electronic Systems Eng. Center, Naval Facilities Eng. Command, Naval Sea Systems Command, DNA, Mechanical and Electrical Eng. Dept., CEL
KEYW Perimeter Alarm Systems; Lock Devices; Sensor Status; Lock Technology; Active Sensors; Passive Sensors; Weapons; Armor Plates; Bullet Proof; Physical Security Planning; Access Controls; Physical Security Evaluation
ABST Compilation of research and development projects with reference to physical security. Research was performed by CEL. Includes the following reports: "Evaluation of a Perimeter Public Address System for Naval Weapons Station", "Phys. Sec. RDT and E Work Unit Prog. Report No. 2", "Evaluation of Emergency Door Locking Device Shear Pin", "Sum Report-Security Eng. and Consultation Services", Sum Report-Ballistic Protection for Weapons in transit", "DNA Magazine Door Relocking Hardware Development", "Status of the Phys. Sec. Info. Center", "Field Review of Opening Control Hardware", "Areas in Phys. Sec. requiring RDT and E", "High Sec Lock Hasp Evaluation", "Phys. Sec. RDT and E. Prog Sum Report", "Architectural Details Sum. Report", "DNA Magazine Door Relocking Hardware Development".

42 ACNO RL00008
YEAR 1979 05
RCNO 77-07R
AUTH Gray, K.O.
TITL Key-Operated Security Locks and Hasps (4)
PUBL Performing Organization: Civil Engineering Laboratory, Naval Construction Battalion Center Controlling Office: Department of the Navy
KEYW Lock Parts; Lock Technology; Hasp Locks; Shackle of Padlock
ABST Report on the results of an investigation concerning the constituents of high, medium and low security locks. Military specification MIL-P-43607D sets the highest level of performance for any of the key operated padlocks specified for use by DOD and MIL-H-439511 for the corresponding hasp. MIL-P-43951 qualifies medium security and MIL-P-17802D designates the low security padlock.

43 ACNO RL00009
YEAR 1977 12

RCNO 76-08R
TITL High Security Hasps for Naval Environments (3)
PUBL Performing Organization: Civil Engineering Laboratory Controlling Office: Department of Navy
KEYW Hasps; Lock Technology; Ships and Boats; Facilities, Locations; Port Facilities; Waterfront Areas; Lock Parts; Shackle of Padlock
NOTE High Security Hasps; Naval Environments
ABST The full potential of the Navy's Shrouded Shackle High Security Padlock to protect armories, ammunition storage magazines and other sensitive spaces can only be realized if it is matched with an equally good hasp, door, door attachment system and structure.

44 ACNO RT00001
YEAR 1972
RCNO ANSI A156.2-1972
AUTH American National Standards Institute, Inc.
TITL American National Standard Lock and Lock Trim (23)
PUBL Publisher: Builder's Hardware Manufacturers Association; Performing Organization: American National Standard Institute, Inc.; Controlling Office: Builders Hardware Manufacturers Association
KEYW Lock Types; Lock Technology; Bore-in-Locks; Mortise Locks; Dead Locks
ABST A sectional classification system to recognize the diversity in the general classification of builders hardware. Includes general requirements and informatin on mortise, preassembled, integral and bored locks and trim.

45 ACNO RT00002
YEAR 1973 12
AUTH Newman, Oscar
TITL A Design Guide for Improving Residential Security (75)
PUBL Performing Organization: The Center for Residential Security Design Controlling Office: U.S. Department of Housing and Urban Development Monitoring Agency: Office of Policy Development and Research, Division of Building Technology
KEYW Doors; Builders Hardware; Hardware Properties; Residential Facilities; Alarm Technology; Personnel; Security Administration & Management; Personnel Selection; Physical Security Planning; Physical Security Evaluation; Lock Devices; Control, General; Access Control Systems; Facilities, Locations; Electronic Security Systems
NOTE Residential Security; Defensible Space
ABST Four approaches for improving residential security are emphasized: (1) creation of a fortification with limited and controlled access points; (2) subdivision of a large residential complex into smaller components so each may be controlled naturally by a small number of residents; (3) relocation of a particularly vulnerable group into a safe area occupied by that group alone; (4) inundation of a residential complex by security personnel.

46 ACNO RT00003
YEAR 1977 09

RCNO SAND77-1033: AT (29-1) 789
TITL Entry Control Systems Handbook
PUBL Performing Organization: Sandia Laboratories; Controlling Office: Division of Safeguards and Security; Monitoring Agency: Department of Energy
KEYW Entry Control Devices; Control, General; Access Control Systems; Access Controls; Personnel Recognition Methods; Metal Sensors; Alarm Technology
NOTE Special Nuclear Materials Monitors; Metal Detectors; Explosives Detectors; Package Search Systems
ABST An entry-control system functions in a total Physical Protection system to allow the movement of authorized personnel and material through normal access routes, yet detect and delay unauthorized movement of personnel and material from controlled areas. The material in this handbook is primarily restricted to those elements of a safe guards system related to entry-control technolcgy. All known entry-control equipment has been listed in this handbook for completeness.

47 ACNO RT00004
RCNO NAVEDTRA 91424
TITL Nonresident Career Course - Master-at-Arms (88)
PUBL Publisher: Naval Education and Training Support Command; Performing Organization: Naval Education and Training Support Command
KEYW Physical Security Policy and Procedure; Security Administration & Management; Personnel; Military Personnel; Orientation, Education, and Training; Physical Security Policy and Procedure; Security Manuals
ABST The Master-at-Arms non-residential career course is an independent study program designed to teach skills required for advancement in the M-A rating.

48 ACNO RT00005
YEAR 1974
RCNO NAVEDTRA
TITL Master-at-Arms - Training Manual (287)
PUBL Publisher: Naval Education and Training Support Command Performing Organization: Naval Education and Training Support Command
KEYW Physical Security Planning; Physical Security Policy and Procedure; Security Administration & Management; Security Personnel; Orientation, Education, and Training; Security Infractions; Security Manuals
ABST Manual is designed to train MAs to be able to plan, supervise, and perform security duties afloat and ashore, including investigation, interrogation, apprehension, and correction. This manual is designed to be self instructional.

49 ACNO TN00001
YEAR 1977 12
RCNO TN-1512
AUTH Brooks, J.L.
TITL Heat-Activated Alarm System for Railroad Boxcars Carrying Explosives (27)

PUBL Performing Organization: Civil Engineering Laboratory, Naval Construction Battalion Center Controlling Office: Naval Facilities Engineering Command
KEYW Rail Facilities; Facilities, Locations; Alarm Sensors; Alarm Technology; Heat Sensors; Heat Detectors
ABST An alarm system concept designed to alert train operators of excessive heating of any of the wheels of a boxcar laden with high-explosives has been developed. The alarm system consists of heat sensors that are located on the boxcar above each wheel. These are wired tc an alarm transmitter mounted near the top of the boxcar.

50 ACNO TN00002
YEAR 1979 03
RCNO TM-64-79
AUTH Gray, K.O.
TITL Background and Information Related to the Security Upgrade of Conventional Arms, Ammunition, and Explosive Storage Structures; (41)
PUBL Performing Organization: Civil Engineering Laboratory Controlling Office: Civil Engineering Laboratory
KEYW Armories; Facilities, Locations; Arsenals; Builders Hardware; Barrier Penetration; Doors; Perimeter Barriers; Windows;
NOTE Delay Time; Penetration Resistance;
ABST This memorandum discusses the probability of implimentation of a security upgrade of conventional arms ammunition, and explosive storage structures. Appendices include: Phys. Sec. RDT and E, discussion of barrier philosophy, factors affecting penetration resistance, delay time, perimeter barriers, door openings, design parameters for door systems, door hardware.

SECTION 2
KEYWORD INDEX

This section presents the Keyword Index produced by the Physical Security Data Management System. It consists of a complete alphabetical listing of all keywords currently in the Data Management System's controlled vocabulary that can be used for retrieval of bibliographical records in the Master List. It consists of six pages of computer output.

Volume II, the User's Manual, presents detailed instructions on how to use the Keyword Index.*

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* Ibid.

SECTION 3
KEYWORD COUNT

3.1 OVERVIEW

This section presents the Keyword Count produced by the Physical Security Data Management System. It is divided into two parts as explained in the subsections below. Both parts consist of two pages of computer output.

3.2 KEYWORD COUNT—VOCABULARY WORDS

Page 28 presents an alphabetical listing of all keywords currently in the Data Management System. Opposite each keyword is the absolute number of times the keyword appears in separate Master List bibliographical records followed by the percentage of this frequency. Volume II, the User's Manual, describes utilization of this output in more detail.*

3.3 KEYWORD COUNT—DICTIONARY

Page 29 presents a listing of all keywords currently in the Data Management System arranged according to frequency, from highest to lowest. Opposite each keyword is the absolute number of times the keyword appears in separate Master List bibliographical records followed by the percentage of this frequency. Volume II, the User's Manual, describes utilization of this output in more detail.*

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* Ibid.

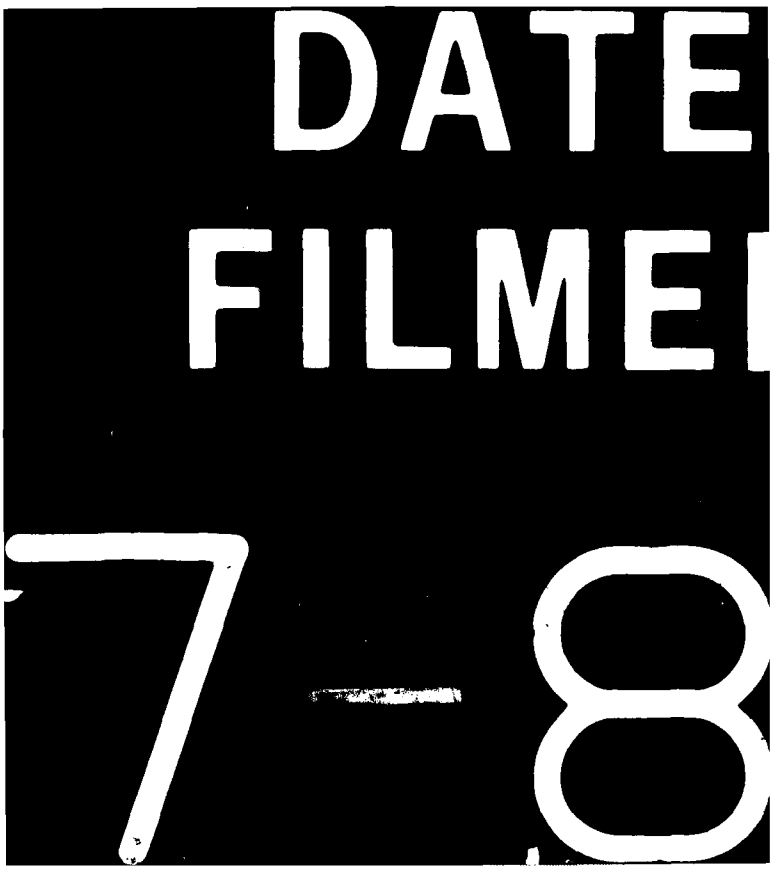
V O C A B U L A R Y W O R D S

Access Control Systems	8	2.43	Environmental Effect	1	0.30	Perimeter Barriers	1	0.30
Access Controls	7	2.13	Espionage	2	0.61	Personnel	5	1.52
Active Intrusion Sensors	2	0.61	Explosives	2	0.61	Personnel Recognition Methods	1	0.30
Active Sensors	1	0.30	Facilities	2	0.61	Personnel Selection	4	1.22
Air Cargo Thefts	1	0.30	Facilities, Locations	9	2.74	Photo Electric Alarm Systems	1	0.30
Air Piracy	2	0.61	False Alarms	1	0.30	Physical Security Evaluation	7	2.13
Airports	3	0.91	Fence Alarms	1	0.30	Physical Security Planning	7	2.13
Alarm Equipment Distributors	1	0.30	Fences	1	0.30	Physical Security Policy and Pro	1	0.30
Alarm Monitors	1	0.30	Fingerprint Identification System	1	0.30	Physical Security Policy and Proc	9	2.74
Alarm Sensors	2	0.61	Forced Entries	1	0.30	Physical Security Review Committe	1	0.30
Alarm Systems - Detection Systems	1	0.30	Forced Entry Methods	3	0.91	Port Facilities	2	0.61
Alarm Technology	11	3.34	Hardware Properties	1	0.30	Power Supplies	1	0.30
Architectural Designs	1	0.30	Hardware Properties-Composition	1	0.30	Program Testing	1	0.30
Area Sensor	1	0.30	Hasp Locks	1	0.30	Rail Facilities	1	0.30
Armor Plates	2	0.61	Hasps	1	0.30	Remote Station Alarm System	1	0.30
Armored Doors	1	0.30	Heat Detectors	1	0.30	Residential Facilities	3	0.91
Armories	1	0.30	Heat Sensors	1	0.30	Robberies	1	0.30
Arsenals	1	0.30	Hijacking	2	0.61	Roofs	1	0.30
Arson	2	0.61	Holdups	1	0.30	Security Administration & Managem	11	3.34
Barrier Penetration	3	0.91	Identifier Elements	3	0.91	Security Checklists	1	0.30
Bolts	1	0.30	Infrared Motion Detectors	3	0.91	Security Infractions	3	0.91
Bore-in-Locks	1	0.30	Inner Plates	1	0.30	Security Inspection	3	0.91
Breaching Aids	5	1.52	Inside Jobs	2	0.61	Security Manuals	6	1.82
Bugging	1	0.30	Interior Lighting	1	0.30	Security Personnel	7	2.13
Builders Hardware	7	2.13	Interior Perimeter Protection	1	0.30	Sensor Signals	2	0.61
Bullet Proof	2	0.61	Intrusion Alarm Data	3	0.91	Sensor Status	1	0.30
Burglaries	1	0.30	Intrusion Detection Alarms	2	0.61	Shackle of Padlock	2	0.61
Card Exchange Systems	1	0.30	Lighting	1	0.30	Ships and Boats	3	0.91
Cargo Terminals	1	0.30	Lock Devices	3	0.91	Sound Sensors	1	0.30
CCTV Surveillance Systems	2	0.61	Lock Parts	3	0.91	Surveillance Methods	2	0.61
Classification Management	1	0.30	Lock Technology	8	2.43	Tamper Devices	1	0.30
Classified Material	2	0.61	Lock Types	2	0.61	Terrorist Attacks	2	0.61
Classified Material Reproduction	1	0.30	Manufacturers Association	1	0.30	Terrorist Threats	2	0.61
Classified Transmissions	1	0.30	Metal Sensors	2	0.61	Thickness	1	0.30
Combination Lock Parts	1	0.30	Method of Entry	4	1.22	Types of Entry, Threats	8	2.43
Combination Locks	1	0.30	Methods of Entry	2	0.61	UL Certificated	1	0.30
Combination Locks-UL Designations	1	0.30	Microwave Alarm Systems	1	0.30	UL Listed	1	0.30
Computer Security	4	1.22	Military Personnel	1	0.30	Ultrasonic Frequency	1	0.30
Control, General	15	4.56	Monitoring Stations	2	0.61	Vandalism	3	0.91
Dead Bolts	3	0.91	Mortise Cylinders	1	0.30	Vehicle Traffic Control	1	0.30
Dead Locks	2	0.61	Mortise Locks	1	0.30	Walls	1	0.30
Detection Systems	1	0.30	Motion Sensors	1	0.30	Waterfront Areas	1	0.30
Doors	3	0.91	Orientation, Education, and Train	3	0.91	Weapons	1	0.30
Electric Locks	1	0.30	Padlocks	2	0.61	Weapons Detection	1	0.30
Electromagnetic Interferance	1	0.30	Panic Bolts	1	0.30	Window Guards	1	0.30
Electromechanical Devices	1	0.30	Parking Facilities	1	0.30	Windows	3	0.91
Electronic Security Systems	3	0.91	Passive Sensors	1	0.30			
Entry Control Devices	3	0.91	Perimeter Alarm Systems	1	0.30			

KEYWORD COUNT - CEL BIBLIOGRAPHY 01/24/80

D I C T I O N A R Y

Control, General	15	4.56	Explosives	2	0.61	Hardware Properties	1	0.30
Alarm Technology	11	3.34	Facilities	2	0.61	Hardware Properties-Composition	1	0.30
Security Administration & Managem	11	3.34	Hijacking	2	0.61	Hasp Locks	1	0.30
Facilities, Locations	9	2.74	Inside Jobs	2	0.61	Hasps	1	0.30
Physical Security Policy and Proc	9	2.74	Intrusion Detection Alarms	2	0.61	Heat Detectors	1	0.30
Access Control Systems	8	2.43	Lock Types	2	0.61	Heat Sensors	1	0.30
Lock Technology	8	2.43	Metal Sensors	2	0.61	Holdups	1	0.30
Types of Entry, Threats	8	2.43	Methods of Entry	2	0.61	Inner Plates	1	0.30
Access Controls	7	2.13	Monitoring Stations	2	0.61	Interior Lighting	1	0.30
Builders Hardware	7	2.13	Padlocks	2	0.61	Interior Perimeter Protection	1	0.30
Physical Security Evaluation	7	2.13	Port Facilities	2	0.61	Lighting	1	0.30
Physical Security Planning	7	2.13	Sensor Signals	2	0.61	Manufacturers Association	1	0.30
Security Personnel	7	2.13	Shackle of Padlock	2	0.61	Microwave Alarm Systems	1	0.30
Security Manuals	6	1.82	Surveillance Methods	2	0.61	Military Personnel	1	0.30
Breaching Aids	5	1.52	Terrorist Attacks	2	0.61	Mortise Cylinders	1	0.30
Personnel	5	1.52	Terrorist Threats	2	0.61	Mortise Locks	1	0.30
Computer Security	4	1.22	Active Sensors	1	0.30	Motion Sensors	1	0.30
Method of Entry	4	1.22	Air Cargo Thefts	1	0.30	Panic Bolts	1	0.30
Personnel Selection	4	1.22	Alarm Equipment Distributors	1	0.30	Parking Facilities	1	0.30
Airports	3	0.91	Alarm Monitors	1	0.30	Passive Sensors	1	0.30
Barrier Penetration	3	0.91	Alarm Systems - Detection Systems	1	0.30	Perimeter Alarm Systems	1	0.30
Dead Bolts	3	0.91	Architectural Designs	1	0.30	Perimeter Barriers	1	0.30
Doors	3	0.91	Area Sensor	1	0.30	Personnel Recognition Methods	1	0.30
Electronic Security Systems	3	0.91	Armored Doors	1	0.30	Photo Electric Alarm Systems	1	0.30
Entry Control Devices	3	0.91	Armories	1	0.30	Physical Security Policy and Pro	1	0.30
Forced Entry Methods	3	0.91	Arsenals	1	0.30	Physical Security Review Committe	1	0.30
Identifier Elements	3	0.91	Bolts	1	0.30	Power Supplies	1	0.30
Infrared Motion Detectors	3	0.91	Bore-in-Locks	1	0.30	Program Testing	1	0.30
Intrusion Alarm Data	3	0.91	Bugging	1	0.30	Rail Facilities	1	0.30
Lock Devices	3	0.91	Burglaries	1	0.30	Remote Station Alarm System	1	0.30
Lock Parts	3	0.91	Card Exchange Systems	1	0.30	Robberies	1	0.30
Orientation, Education, and Train	3	0.91	Cargo Terminals	1	0.30	Roofs	1	0.30
Residential Facilities	3	0.91	Classification Management	1	0.30	Security Checklists	1	0.30
Security Infractions	3	0.91	Classified Material Reproduction	1	0.30	Sensor Status	1	0.30
Security Inspection	3	0.91	Classified Transmissions	1	0.30	Sound Sensors	1	0.30
Ships and Boats	3	0.91	Combination Lock Parts	1	0.30	Tamper Devices	1	0.30
Vandalism	3	0.91	Combination Locks	1	0.30	Thickness	1	0.30
Windows	3	0.91	Combination Locks-UL Designations	1	0.30	UL Certificated	1	0.30
Active Intrusion Sensors	2	0.61	Detection Systems	1	0.30	UL Listed	1	0.30
Air Piracy	2	0.61	Electric Locks	1	0.30	Ultrasonic Frequency	1	0.30
Alarm Sensors	2	0.61	Electromagnetic Interferance	1	0.30	Vehicle Traffic Control	1	0.30
Armor Plates	2	0.61	Electromechanical Devices	1	0.30	Walls	1	0.30
Arson	2	0.61	Environmental Effect	1	0.30	Waterfront Areas	1	0.30
Bullet Proof	2	0.61	False Alarms	1	0.30	Weapons	1	0.30
CCTV Surveillance Systems	2	0.61	Fence Alarms	1	0.30	Weapons Detection	1	0.30
Classified Material	2	0.61	Fences	1	0.30	Window Guards	1	0.30
Dead Locks	2	0.61	Fingerprint Identification System	1	0.30			
Espionage	2	0.61	Forced Entries	1	0.30			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